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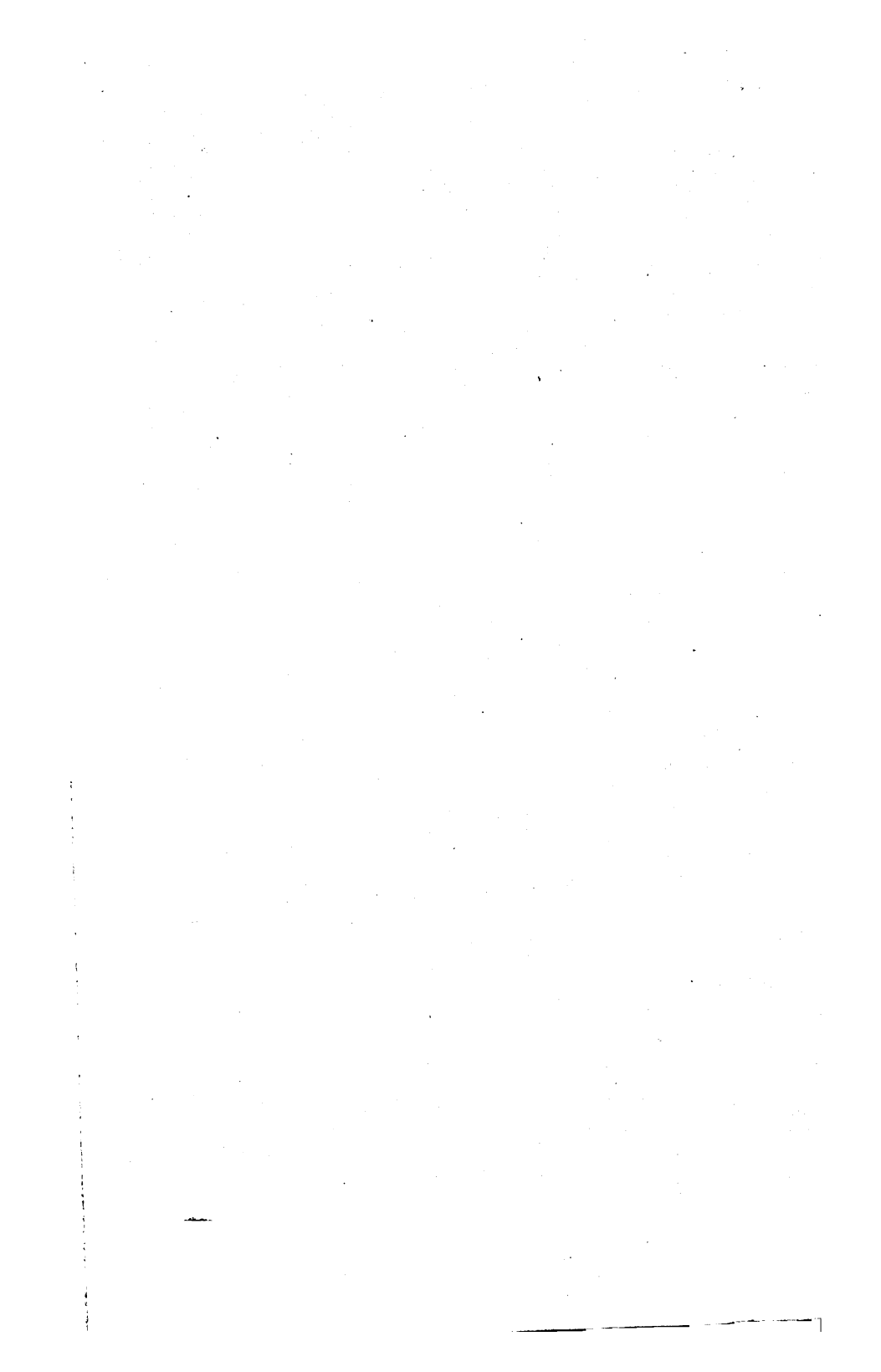
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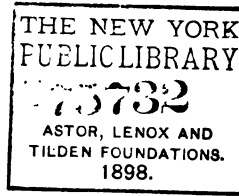


Gresham Angling Society.

PAPERS.

SESSION 1882—83

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The Gresham Angling Society.

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PROYVEN
CLUB
1898

PREFACE.

It had long been the feeling of many of the members of the Gresham Angling Society that the dissemination of useful information, one of the objects for which the Society was founded, could best be carried out by the reading, discussion, and publication of papers or essays such as those contained in the present volume. The idea in itself is not new, most of the learned societies publishing a record of their transactions, and in one or two instances, anglers, notably those of Manchester, have adopted the same principle with very marked success. It was however felt that, as no regular readings of similar essays took place at the meetings of any London Angling Society, it would be desirable for "The Gresham" to make the attempt; how far it has succeeded, the interest evoked by the papers, and the large attendances on the occasions when they have been read, abundantly show. In addition to the essays now given to the world, several members have kindly favoured the Society with short and pithy statements relative to various angling topics, which, together with the admirable papers read by Mr. George Austin on "Izaak Walton

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and Sir Thomas Gresham," Mr. Charles Bates on "Perch Fishing," Mr. Edwin Frost on "Fly Fishing," and Dr. J. Theodore Cash on "The Barbule of the Barbel," may well form the nucleus of a future volume.

In all cases it will be understood that the views of the writers are not necessarily those of the Society, but the discussion which has followed the readings, and the favourable criticism bestowed upon them by the press, justify us, we think, in offering them to a wider circle of readers than they have hitherto reached.

The success of the Society has largely resulted from the soundness of the principles on which it was founded, and the energy displayed by everyone concerned in carrying them out. Started in March, 1881, it has already acquired a high reputation, having aided more or less every movement having for its object the advancement of the art of angling. The Society rents water of its own at Waltham, where it is now conducting some important experiments in fish culture; it possesses a good museum, including several magnificent cases of pike, perch, roach, and grayling, samples of those taken by its members; and has also a large library of standard works on ichthyology and angling. In advocating angling in the spirit of Izaak Walton, for the sake of the sport and pleasure it affords, rather than for the sake of taking the

largest number of fish possible and giving prizes for so doing, it has steadily endeavoured to raise the general emulation of other societies by the enunciation of principles that it is believed will save our rivers from depletion, and at the same time ultimately bring the angler more sport than in the ordinary way it is now possible for him to obtain. The Society contemplate the production of a medal such as those awarded by many learned societies, which will be given in lieu of a money-prize to the most successful of its members from year to year.

Like all new institutions, the Society has of course encountered dissension and met with some amount of adverse criticism. This has been to some extent beneficial, as the most perfect harmony now prevails amongst its members, who are thoroughly united on its general policy, and work heartily together in carrying it out.

It only remains to add that the Society meets regularly every Tuesday evening at Masons' Hall Tavern, Masons' Avenue, Basinghall Street, E.C., the chair being taken at 7 p.m. Their museum is then freely open to the inspection of visitors and country anglers, who are always heartily welcomed. Information as to terms of membership, rules, etc., can always be had on application to the Hon. Secretary.

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Gresham Angling Society.

A PAPER

ON THE

CAUSES OF THE APPARENT DIMINUTION OF FISH
IN THE RIVER THAMES;

WITH REMEDIAL SUGGESTIONS.

BY

THOMAS CRUMPLEN,

HON. SECRETARY.

READ BEFORE THE SOCIETY OCTOBER 27TH, 1881.

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ASTOR, LENOX AND
TILDEN FOUNDATIONS.
1898.

The subject of the following Essay, the first read before the Gresham Angling Society, is one that justly claims, and receives, the attention of all anglers who love our grand old river. Events that have occurred since it was written only confirm the opinions therein expressed, but for these opinions the writer is alone responsible. He trusts, however, that their publication by the Society will serve some useful purpose, and strengthen the hands of all who are interested in preserving and replenishing the stock of fish in the Thames.

GRESHAM ANGLING SOCIETY.

ON THE CAUSES OF THE APPARENT DIMINUTION OF FISH IN THE
RIVER THAMES ; WITH REMEDIAL SUGGESTIONS.

BY THOS. CRUMPLEN, HON. SECRETARY, ETC.

READ THURSDAY, OCTOBER 27TH, 1881, CAPTAIN ALFRED IN THE CHAIR.

FROM all time our grand historic Thames has been known as a good fish-producing river, and only a little over a century since salmon,* trout, roach, dace, eels, flounders and other fish could be caught in abundance at London Bridge, whilst hundreds of professional fishermen earned their livelihood in the heart of the City, by the very fecundity of its waters. There were, for example, well-known swims for the rodster off Bankside, the Temple, Somerset House, and the Savoy, as was indeed the case down to a much later period. In the time when railways and

* The old story of a clause being placed in the indentures of a London apprentice that he should not be bound to eat salmon more than a certain number of days in the week, is erroneous.— See *Buckland's British Fishes*, p. 312.

privilege tickets were alike unknown, the faithful followers of Izaak, in any part of the metropolis, had but to walk to the river's bank, to stand at least the chance of a fair day's sport, and that with tackle of a much rougher type than is now at the command of even the humblest angler.

Whatever may be said for or against the good old days in other matters, there can be no doubt of their reality so far as angling is concerned, and no less doubt that, for the present at least, they have passed away. It will now be my purpose to put before you what I think are the causes that have brought about so marked a change; to suggest, where possible, remedies; to ask you to discuss them, and see if the Gresham Angling Society cannot do something, however small, to restore the prestige of dear old Father Thames. Time was, when he kept his children clean, provided them with wholesome food, gave them a good bed, and looked after them until they were able to take care of themselves; but he is unable to do so now. Father Thames does not stand alone in this, and, in dealing with him, I am but dealing with him in his patriarchal capacity, taking him really as the representative of every stream in the country to which anglers resort.

I take it to be admitted that fish *are* gradually diminishing in numbers; if it be not so, then is there no need for fence months and other protective

measures, now so properly resorted to. Bear in mind, therefore, two important facts. Fish were formerly abundant in that part of the river running through the metropolis—there are still fish there—but for the most part they may be said to have disappeared. In the upper waters of the same river they are not so numerous as they used to be, in some cases not so large, and are being gradually overtaken by the fate which befel their metropolitan *confreres*, some two generations ago.

Now I venture to affirm that the very conditions that have practically exterminated the fish in the London waters are, in a degree, precisely those now operating in the more sylvan portions of the river. What I may call the fisheries of old London succumbed only as docks, factories, and gasworks multiplied, the noxious refuse from which was turned into the Thames, there to commingle with the sewage of a great city, the whole being stirred up and battered by the iron or copper bottomed steam-boats which, at the same time, appeared on the scene. Moreover, nets were in constant operation, and the baser sort of the population probably but too ready to make use of them. What wonder, then, that fish disappeared from such a water—or will disappear from any water where such conditions prevail.

I put it, therefore, that these or similar causes are now in operation, in a minor degree, in the non-tidal

waters of the Thames, and just in proportion as these causes increase, so will our stock of fish inevitably diminish. It has been repeatedly stated that the vast increase of late years in the number of anglers is sufficient alone to account for the diminution of fish, but I venture to assert that if our river be properly cared for, its quantity of fish would never be seriously affected by any fair rod and line angling. It should also be borne in mind that just as anglers multiply so do fish become more wary, and that although we have more anglers, each has, as a rule, a lesser proportionate take than formerly.

These are days of Board Schools, and even the fish are being educated. The constant taking of small fry, coupled with other circumstances, has left a few wary old fish, who have occasionally, perhaps, felt the hook, and become more cunning in consequence. In accordance with the instinct implanted in them by the Creator, this faculty is to some extent transmitted, and I believe, *within given limits*, each succeeding race of fish will become more difficult to catch.

The only remedy for this (save finer tackle and greater skill) is to increase our stock by every available means, and I do not think this is as yet sufficiently thought of, so far as the commoner, coarse fish are concerned.* It is well known that a

* Mr. Marston is taking up the question of coarse fish culture, and something may soon be done in this direction.

trout of 1 lb. will deposit eggs sufficient to produce 1,000 more, a jack of 28 lbs. nearly 300,000, a perch of 3 lbs. about 150,000, and a roach of 1 lb. over 15,000. Therefore, if the spawn and young of fish could only be properly protected from year to year, there can be no question that, as fish multiply in a far greater ratio than fishermen, there would be abundant sport, at least down to the time when Macaulay's New Zealander surveys the ruins of the metropolis from London Bridge, and finds a fishing rod and Gresham angling ticket among the wreck. It is my strong belief that the preservation and conservation of the spawn and fry would do more than anything else to improve our fisheries; and whilst ready to grant the great utility of the labours of pisciculturists, yet I feel sure if we provide proper harbours for the fish, and give nature a fair chance, she will stock the river with more and healthier fish than any we can artificially raise. The increase in the number of anglers can do no possible harm, so long as they do not take the small fish, and I trust the day is not far distant when *all* the London Clubs will follow our example, and abolish gross weight competitions as they now exist.

Perch, for example, are certainly decreasing in the Thames, and they are not caught by any means of so large a size as formerly. The perch is "a bold biter," and anyone who has fished much in the Thames will

know what quantities of small perch are occasionally taken. The youthful angler, perhaps, does not like to part with them, they are not returned (as they should be) to the water, and the stock suffers in consequence. I hope, during the next session of Parliament, we shall be able to improve upon the Mundella Act, and get our fence months a little more adapted to the fish, so that perch and jack may be better protected ; and, with respect to all fish, let us have one legal standard of size for taking, from Oxford to London Bridge. It certainly seems inconsistent that it should be unlawful to take a perch of less than eight inches one side of the City stone at Staines, but quite lawful to take one of six inches on the other !

Another cause tending to diminish the number of fish are the numerous mills that now exist. I am far from saying that a mill is injurious in itself, but mills, I am told, discharge in many cases a certain quantity of poisonous matter into the river highly prejudicial to the fish. Many chemical substances now used in manufactures were formerly unknown, and the refuse from the mills is consequently different from what it used to be. Paper mills, using immense quantities of caustic potash and chloride of lime, are notoriously objectionable. Mr. Keene, in a recent number of the *Fishing Gazette*, instances two streams—the little Gade, and the Wraysbury section of the Colne—which have deteriorated greatly from this cause, water from

both of which, directly or indirectly, finds its way into the Thames. The lamentable destruction of trout at Wycombe, which occurred whilst these lines were going to press, affords another proof of the risk arising from this class of dangers. An old angling friend told me from experience, and it is confirmed by others, that fish do not live so long now in the well of a punt as they formerly would, and he in consequence contrived a perforated box to let down from the boat, which he found to preserve them alive much longer. The reason seems to be that the well only receives the surface water, which, holding in suspension the noxious products from mills, the drainage from chemical manures used on the land, and other sources, does not thoroughly commingle with the purer water below ; and in this surface water fish cannot live.

Artificial manures on land adjoining the river, in which alkalis, always deleterious to fish, are largely employed, have certainly a great deal to answer for, and although chemical science and mechanical skill may do much to neutralise their effects, a good River Pollution Bill is perhaps the only remedy that will insure their being properly applied.

Another and more serious evil in the Upper Thames is the prevalence of steam launches, which, if they do not altogether mar the sylvan beauty of our glorious river, will in time denude it of its fish. The wash from these vessels is such as to disperse and spoil

vast quantities of spawn ; and Mr. Wheeldon has stated, and the fact is unquestioned, that the young fry are frequently dashed lifeless on the shore. I scarcely know what remedy to suggest for this, short of their entire abolition in the non-tidal waters, but being, as they are, used almost exclusively for pleasure parties, the matter might perhaps be compromised by allowing them to run at a regulated speed during the months of August, September, and October, so that they should not interfere with the chief spawning season.

The next enemies the poor fish have to contend with in their struggle for existence are the swans. I do not put these in the same category as steam launches, because they certainly are somewhat picturesque, and supply the Corporation of London with a time-honoured excuse for a day's outing every year. At the same time, the swans undoubtedly devour large quantities of spawn, and are by no means the friends of the angler. I would not get rid of the swans, of which about 100 are distributed between Richmond Bridge and Staines, and a still larger number between Staines and Oxford ; but I think some arrangement might be made for them to be fed frequently during the spawning seasons, which, if judiciously done, would almost nullify their destructiveness.*

* I am glad to learn that some of the swans have this year been shut up for a time during the perch spawning season, but a little more might still be done in the direction indicated.

Another important matter to be considered is the fact that some fish feed upon others, and if natural conditions are materially interfered with, we may be in danger of lessening our stock of particular species from this cause alone. In the Thames, trout, jack, perch, and chub do their share of this work, but they are all desirable fish to foster, and I trust will long be abundant in the river. We all know what a quantity of fish jack and perch consume, and not only so, but, in many cases, will devour a fish almost as large as themselves. I abominate netting—another great source of mischief—but if tolerated at all it should only be in the hands of a responsible committee ; although, if permissible, I think some few old jack, too wary to be caught, might be safely transferred to an aquarium, to the delight of myriads of roach, and dace, and minnows, who would otherwise provide them with a meal. There is also reason to believe that certain kinds of fish are not taken of so great an individual weight as formerly. A few escape because too wary for the angler ; more probably never attain maturity ; and others get an insufficient supply of food, owing to the conditions by which they are surrounded.

Such are a few of the most important causes leading to a diminution of fish in the river. A new source of danger has lately appeared in the shape of floods, arising largely from artificial causes, which

undoubtedly scatter, and do much harm to certain classes of fish ; but on these and other points which I trust will crop up during the discussion, time will not now permit me to dilate.

What I am anxious to impress upon you more particularly is this—that the sewage, docks, factories, gasworks, and steamboats, which destroyed the fisheries of old London, have their modern counterpart in the shape of sewage, mills, chemical manures, and steam launches, which, *unless prompt measures are taken*, will infallibly perform the same work for us in the waters of the Upper Thames. I know the Thames Angling Preservation Society, and the other Preservation Societies too, are doing good service, and I also know that Mr. Forbes, Mr. Capel, and other public spirited individuals, are doing their best to cultivate and replenish our stock of fish, for which all honour to them ! In conclusion I would say, in treating this subject, let us follow as much as possible in the footsteps of nature ; let us impose no needless artificial barriers to the stream ; let us keep our river from pollution ; let our preservation societies *combine*, and take not merely a police, but a scientific view of their duties ; let the angling clubs of London forego the capture of small fish, and act like men in the true Waltonian spirit ; then is there yet time to arrest the destruction going on, and to restore a strong and healthy progeny to dear old Father Thames.

THE
SENSE OF PAIN IN FISHES.

A PAPER,

READ AT A MEETING OF THE

GRESHAM ANGLING SOCIETY,

BY

MR. C. S. BENTLEY, F.R.M.S., &c. &c.,

NOVEMBER 3RD, 1881.

LONDON :

GILBERT AND FIELD, 67, MOORGATE STREET, E.C.

AND DARLING AND SON, 35, EASTCHEAP, E.C.

PRICE SIXPENCE.

INTRODUCTION.

The following paper deals with the sense of pain in fishes, mainly from the standpoint of the physiologist. The subject may well be handled from other points of view ; the author hopes, meanwhile, that further investigation will only tend to confirm his conclusions—a result most satisfactory to all followers of the gentle art.



FIG. 1.

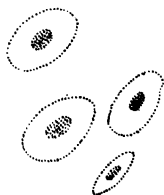


FIG. 2.



FIG. 3.

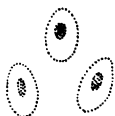


FIG. 8.



FIG. 4.

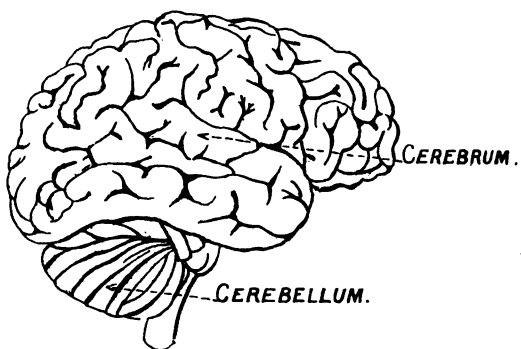


FIG. 7.

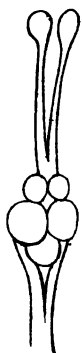


FIG. 5.

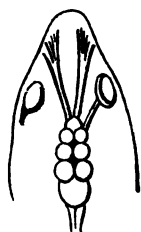


FIG. 6.



NOTES TO DIAGRAMS.

Fig. 1.—These blood discs (frog) are typical of the class reptilia. It will be observed that the shape is oval, and (compared with the human blood discs) of large size.

Fig. 2.—Represents human blood discs, which, it will be seen, are quite round, and much smaller than the reptilian discs.

Fig. 3.—Blood discs of fish (roach). These are of a decidedly oval form, and somewhat larger than the blood discs in man.

Fig. 4.—Human brain, showing relative size of cerebrum (red) and cerebellum (plain); (after Hirschfeld and L  veill  , from Bastian's *The Brain as an Organ of Mind*, a valuable work omitted by accident from the list of authorities on pages 31, 32).

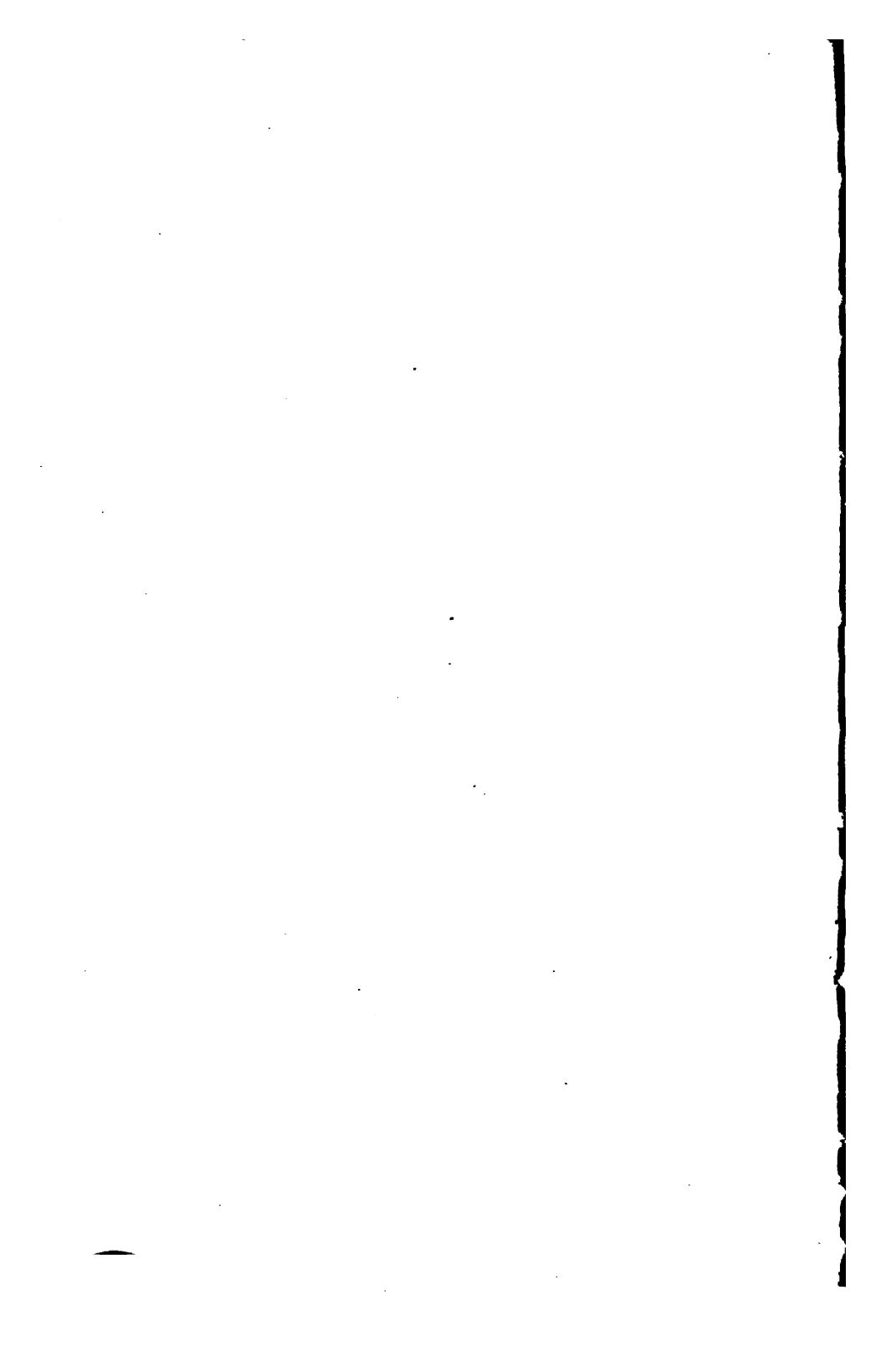
Fig. 5.—Brain of eel. (Owen).

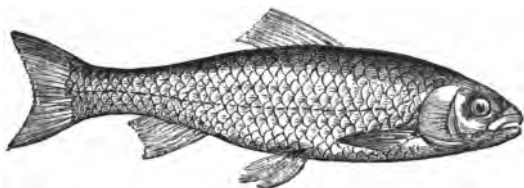
Fig. 6.—Brain of carp. (Ferrier).

Fig. 7.—Brain of chub. (Owen).

Fig. 8.—Brain of perch. (Owen).

} See note, page 26.





THE SENSE OF PAIN IN FISHES.

THIS is a subject very difficult to treat in a familiar manner, but I will do my best to make it as interesting as possible, and must therefore claim your kind indulgence when you listen to some parts of this little Paper that may of necessity seem rather dry and abstruse. After this short preface I will not trouble you with a long account of the piscine anatomy, but, trusting to your general acquaintance with the finny tribe, proceed with our subject.

Fishes, as we all know, are vertebrates : that is to say, they have a backbone. They are in possession also of a system of nerves which, in some respects, is very much like that of the Reptilia, but is not of the same kind as that of the Mammalia.

We have to do to-night with the sense of pain that may be felt by this piscine nervous organisation.

Our subject resolves itself into the question : "Can fishes feel pain ?" Subject to your giving me your kind attention for a little while, I think I shall be able to prove to you that they do not, or at least that the sense of pain is with them very different to that

obtaining in the warm-blooded creation. We will now consider some of the reasons why a fish does not feel pain as acutely (say) as a human being.

It goes without saying, as the French have it, that a man (an angler for instance) feels pain, and sometimes a great deal of it, when the hook that should have found its way to a good hold in a trout, salmon, or what not, gets a firm location instead in Mr. Piscator himself. I am not a medical man, but I certainly think our worthy Chairman, Dr. Brunton, would tell us that such an accident is likely to cause considerable irritation and inflammation, which would most likely be followed by mortification. Having shown you that men (or, at any rate, anglers) feel pain, let us inquire the reasons for this, which are, to sum up shortly, these, viz. :—man feels pain acutely because his brain is very large, especially the perceptive part (the cerebrum) ; the nerves connected therewith are also exceedingly minute, and are in myriads almost everywhere. Man is also warm-blooded, which implies by itself a great sensibility, and, in addition, to show an observer that pain is felt, man can use his voice in complaint. This last is of course not necessary to the painful sensation, and is merely mentioned as an accessory, the facts showing that man is endowed with feelings sensitive to pain, and has a natural indicator of the same.

A fish is in all these respects quite the reverse of

the human being, as it has a small brain (with a particularly small cerebrum), fewer nerves, and those large; the fish is also cold-blooded, and has no voice to defend itself from the infliction of pain which, the probability is, it does not feel.

Let us now examine point the first, viz., the small size of a fish brain. Of course this is relative, and taking the heaviest brain first, that of

Relative weight of Brain.	{ Man is about $\frac{4}{100}$ of total weight.		
	Dog	„ $\frac{1}{100}$	„
	Carp	„ $\frac{1}{800}$	„
	Chub	„ $\frac{1}{812}$	„
	Pike	„ $\frac{1}{1300}$	„
	Shark*	„ $\frac{1}{2400}$	„

You thus see man's brain is extremely large, much the largest of the series. The dog also has a large brain. The next four instances, however, are a remarkable contrast, and are striking examples of the smallness of the brain in fishes.

* The shark, which for extreme smallness of brain is at the bottom of the list, certainly behaves in a way that corroborates the theory that the sensibility of a living creature is proportionate to the relative size of the brain; thus Günther says that "The Greenland shark, when feeding on the carcase of a whale, allows itself to be repeatedly stabbed in the head without abandoning its prey;" and many authors make similar statements. The want of sensibility in the pike (also extremely small-brained) is particularly touched upon in the note from Sir Humphrey Davy further on. Several corroborative accounts are also related in the "Angler Naturalist" both as regards the shark and pike.

Here you will observe rough diagrams of the brains of an eel, a carp, a chub, and a perch ; and, looking at these sketches, you cannot fail to notice that the fish brain consists mainly of those parts necessary to sight, smell, and locomotion, and how very little of the brain is left for anything else.*

It is possible that the last remarks may not be clear without explanation ; so I will therefore add that the part of the brain more particularly concerned in sensation, or consciousness, is the cerebrum ; or, at any rate, many physiologists hold this opinion. It is, however, a point that is not quite settled, and I myself believe that the cerebrum acts the part of a slate to the nerve, which we may consider the pencil, thus being, as it were, the registrar of the impressions of any kind whatever conveyed by the nerves, including even those senses having their own ganglia (or limited brains, as they may be called), as sight, smelling, etc. ; that is to say, while those parts exist. If the cerebrum is destroyed, as has been done experimentally by Flourens, Ferrier, Lemoigne, and many others, the ganglia of particular parts of the animal are able to carry on very often (and automatically

* In the diagrams the cerebral ganglia (corresponding to the cerebrum in man) are coloured Red ; the optic ganglia, Blue ; the olfactory ganglia, Yellow ; while the cerebellum, usually considered to be concerned in regulating motion, is left plain, as also is the spinal cord connected therewith.

as it were) their several functions, but all the while the animal is unconscious, or nearly so, this being the result of the absence of the cerebrum, or of its partial extirpation.

As usual in questions where two views may be taken, some contend that the cerebrum does not form the seat of sensibility, and it may be open to argument; but, considering that the more an animal is known to feel pain the larger usually is the cerebrum, it certainly looks as if pain had its sensorium there, although it is not altogether easy to demonstrate, as the brains of Her Majesty's living subjects are not, under existing circumstances, allowed to be removed from their cases. Without going any further, however, I think you will be satisfied that the brain of a fish is very small; that the cerebrum it includes is also very minute; and is most likely far too insignificant, reasoning by analogy, to record a great amount of sensation of any sort or kind.

We will now for a little while consider the second point, which is the (in general) lesser number of a fish's nerves, which are also commonly twice or three times greater in diameter than those in warm-blooded animals. Now, the first effect of this would be that a hook (say) in penetrating a fish's mouth or body would lacerate a much smaller number of nerves than if the same hook penetrated a human being, and would, consequently, cause very much greater pain

to a man than to a fish—even if their respective brain registers (cerebrums) were on a par, which, however, they are not. This can be shown by analogy—as the nervous current is in its behaviour very much like electricity, and it is very well known that a number of little currents of electricity are much more intense than a few much larger ones.

Through having large nerves, fishes have wonderfully quick sight and are also extremely sensitive to sound, or rather to vibration, but no one has ever been able to prove that fishes see distinctly, thus showing that between quickness of perception and acuteness of feeling there is often a wide interval.

We have now reached our third point, viz., that fishes, having cold blood, their sensibility to pain must be dull and obtuse. On this diagram sheet you will see are figured the blood discs of certain fishes, reptiles, and warm-blooded animals. Notice the difference between them, especially the roundness of the last-mentioned kind, while the fish and reptile discs have a distinctly oval form. While I am far from saying that sensibility resides in the blood, I think that you will agree with me that, where the blood is different, the product, so to say, of that blood will be different also. The flesh, for instance, with all its nerves and muscles, will vary greatly, according to whether it is taken from a sheep or a salmon, a bullock or an eel. Further, to show you how the

blood has the power to modify the parts of an animal, let me call your attention to the scales of various fish, some of which are shown under the microscopes on this table,—the piscine blood having the power directed by its proper organisation to form scales, where the blood of a mammal would form hair or wool. Not being able to obtain a fish this evening to show the circulation and blood discs, we have here a frog, in which the phenomena are very much the same. And while mentioning frogs, I may state as a certain fact that his brother, the toad, certainly appears not to believe in his cold-blooded fellow-creatures feeling pain, as Mr. Toad is in the habit of swallowing whole (of course, without previously killing them) worms, slugs, insects, etc. I make this digression (for it is a digression), as worms, etc., are not fish, to show that anglers do not, in using live worms, etc., for bait, do worse than Nature does herself,—and Nature is never unnecessarily cruel.

We have now got to the fourth argument, which is, that fishes having no voice we may thence infer that they do not feel pain. Here it may be well to mention that Timbs, in his "Things Not Generally Known," says that "Anglers of our time have proved that tench croak like frogs, herrings cry like mice, gurnards grunt like hogs, and some say the gurnard makes a noise like a cuckoo, from which he takes one of his country names." However this of course is not

a true voice, but merely the air escaping from the air bladder, which is quite another thing. Of course I am well aware that the absence of voice would be of itself no sufficient proof, and as far as I know a dumb man feels as acutely as one fluent of speech, but testing this idea of voice being an indication, what do we find? Why this, viz., that from man downwards, wherever an animal has a cry or voice natural to it, it is well known to be subject more or less to pain. Take a dog, for instance, which has a large brain, and for an animal a fair-sized cerebrum; or a cat, which is certainly inferior, but still very sensitive to pain; a horse, or in fact almost any quadruped—all have voices, and all are known, by various indications, to feel pain. This is known as an actual fact, as certain experiments have been tried which showed conclusively that animals of the kind just mentioned would not thrive, or even live, if subject to constant pain. This is in remarkable contrast to the behaviour of our cold-blooded friends, whether fishes or reptiles, pain being apparently unfelt by them, or at any rate, not felt in the same way as by animals higher in the natural scale.

Reptiles which have been well experimented upon are seemingly proof against the most extraordinary mutilations; a turtle, for instance, gets on exceedingly well without his brain, and a novice would find one very difficult to kill. It may be said that reptiles are not

fishes. This is granted, but they are very like fishes in at least three respects, viz., they are cold-blooded, their brain (and nervous system) is very similar, and they live (sometimes) in the water.

There is a little anecdote to relate, that is very pertinent to our subject, taken from Carpenter's "Mental Physiology :"—" Hunter, the great surgeon, had witnessed reflex movements of the legs of a patient, occasioned by excitation, which did not produce sensation. When the patient was asked whether he felt the irritation by which the motions were excited, he significantly replied, glancing at his limbs, ' No, sir, but you see *my legs* do.' " Several instances of a similar character are related in the same work ; amongst others, one where a patient was actually burnt, but although feeling the contact of the hot body that burnt him, did not in any way feel the pain of the burn. These instances must be my answer to those who contend that the convulsive movements of a fish are a sure indication of pain ; they only seem to me reflex actions, and are not produced by the fishes' brain, but by the spinal ganglia.

I have not had access to any previous essay on this subject, but conscious of the imperfections (especially the shortness) of this Paper, I would advise anyone wishing to go further into the matter to consult, amongst others, the following works, viz. : Carpenter's " Mental Physiology," Gegenbaur's " Elements of

Comparative Anatomy," Gunther's splendid work on "Fishes," Lewes' "Physical Basis of Mind," Macalister's "Morphology of the Vertebrates," Owens' standard work on "Comparative Anatomy;" and also, for the results of a great many experiments, "The Vivisection Report" of the Society for the Prevention of Cruelty to Animals. I must not omit the small but valuable book, "Life Theories, etc.," by Lionel Beale. These works will supply much that I cannot enter into this evening. The above list of books may be greatly added to, as I have only named those that have given *me* most assistance. Of course all this must be supplemented by plenty of observation.

Doubtless I have left out a great deal. I hope the fact that the time available for compilation has been very limited will be taken in extenuation of this fault; for instance, you have not had the respective accounts of the well-known perch* that swallowed his own

* In removing the hook from the jaws of a fish (perch) one eye was accidentally displaced, and remained adhering to it. Knowing the reparative capabilities of piscine organisation, I returned the maimed perch, which was too small for the basket, to the lake, and, being somewhat scant of minnows, threw the line in again with the eye attached as a bait, there being no other of any description on the hook. The float disappeared almost instantly; and on landing the new comer, it turned out to be the fish I had the moment before thrown in, and which had thus been actually caught by his own eye. This incident proves, I think, conclusively, that the structure of cold-blooded animals

eye, or the equally well-known pikes* that have declined to be landed until their jaws were sufficiently garnished, and their stomachs also filled with a proper assortment of hooks. I must admit that these were purposely left out, as I thought that anglers knew them as old friends, and would expect to hear from me next (if I mentioned them) that Queen Anne was dead. But, not to take up your time any longer, the case may be summed up shortly in these few words : Fishes do not feel pain because of their small brains and their peculiar nervous systems, coupled to the fact that they are cold-blooded, and this conclusion seems confirmed by their being absolutely mute.

enables them to endure very severe injuries and wounds without experiencing material inconvenience, a fact which may tend to remove any qualms of conscience felt by anglers on the score of the sufferings supposed to be inflicted on their captures.—*From the "Angler Naturalist," by Cholmondeley Pennell.*

* For example, Sir Humphrey Davy says, "I have caught pikes with four or five hooks in their mouths, and tackle which had been broken only a few minutes before ; and the hooks seem to have had no other effect than that of serving as a sort of sauce piquante, urging them to seize another morsel of the same kind." The same writer gives as his opinion "that the nervous system of fish, and of cold-blooded animals in general, is less sensitive than that of warm-blooded animals."

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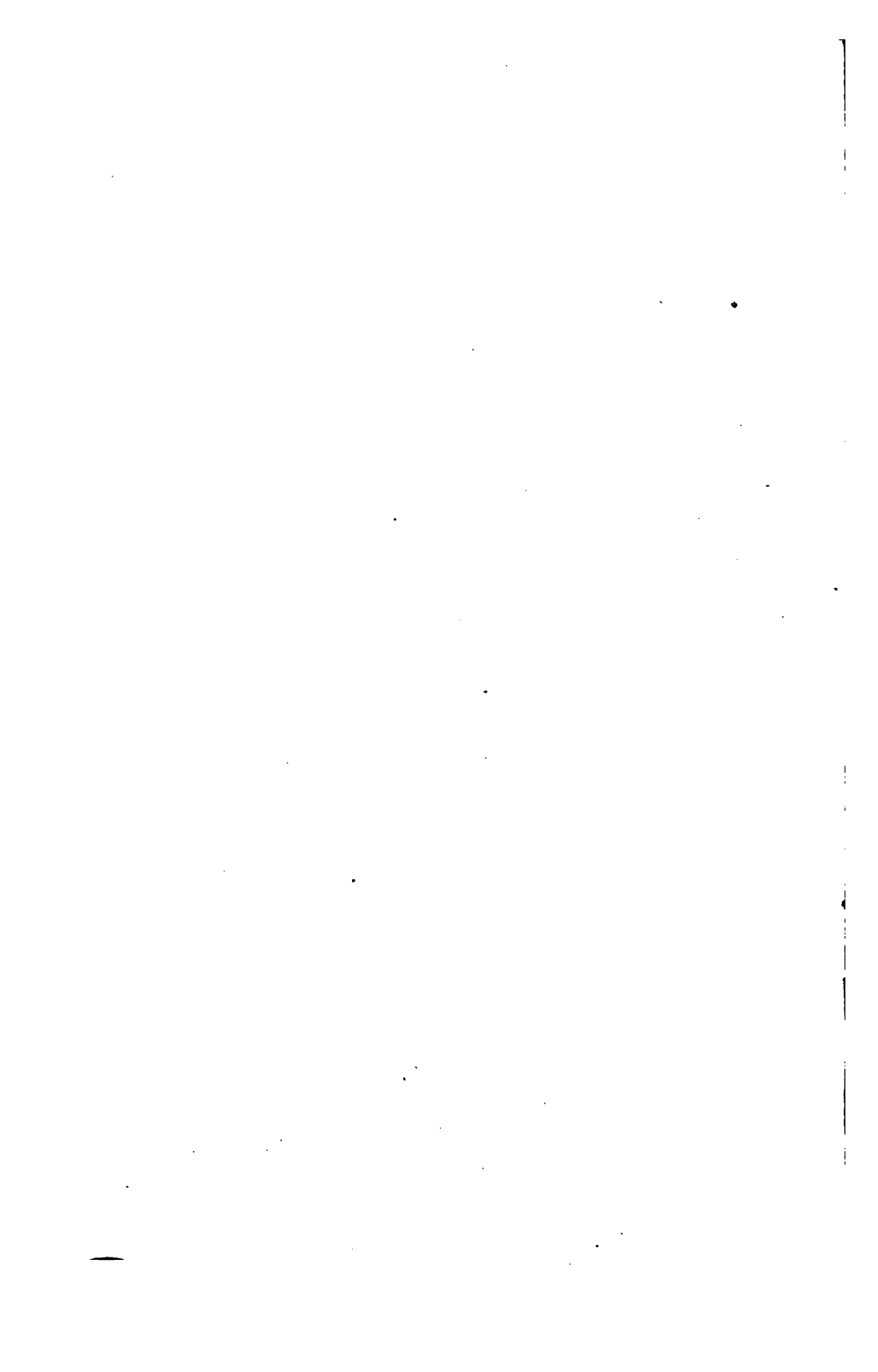
ON THE SCIENCE OF
“PIKE FISHING,”

BY
H. JERVIS ALFRED,
HON. CURATOR.
GOLD MEDALLIST, 1880-1881.

A PAPER
READ BEFORE
THE GRESHAM ANGLING SOCIETY,
10TH NOVEMBER, 1881.

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INTRODUCTION.

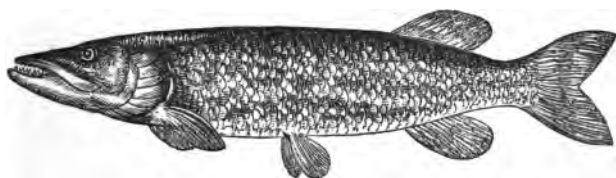
“ Trust me, there is much advantage in it, sir !
You do forget the noisy bother of mankind, and
win communion with sweet Nature’s self, in plying
our dear craft.”—[OLD PLAY.]



ON THE SCIENCE OF PIKE FISHING.

BY H. JERVIS ALFRED, HON. CURATOR.

READ THURSDAY, 10TH NOVEMBER, 1881; A. JARDINE, ESQ., IN THE CHAIR.



Esox Lucius.

THE early history of the pike, unlike that of most of the other members of the finny tribe, is somewhat shrouded in obscurity. His first appearance in literature is believed to have been during the fourth century, where he is referred to as the luce, pickerel, jack, or pike. The origin of the name is also equally obscure, whether we take it as "luce" or the more modern term "pike," unless the latter name had any reference to the piked or pointed shape of the head. However, on the present occasion we will leave any learned disquisitions on the origin of his name to those adept etymologists who delight in the study,

and we will take him under his modern title of pike, without caring much how he received either that name or his more scientific one of *Esox Lucius*—his German title of Wasserwolf being, perhaps, rather more expressive of his real character. It is certain that in English heraldry the pike was the earliest fish granted to be borne in arms, the Lucy family using it so far back as the time of Henry II. Leland mentions that a pike of great size was taken in Ramesmere, Huntingdon, in the reign of Edgar. At the present time the pike is found all over Europe, with representatives of the family in America under the names of pickerel and muscalonge, which latter grow to about 80 lbs. weight in the St. Lawrence River; a model of one which weighed 56 lbs. is in the Buckland Museum. Turning to the weights of European pike, I think we may very safely put aside the celebrated Mannheim pike—a notice of which appears in nearly every work on the subject—as a gross exaggeration. This pike, you will of course remember, was said to have been captured in 1497 wearing a peculiar tablet which fixed his age at about 265 years; his weight when taken was said to be 350 lbs., and his length 19 feet. The skeleton was hung up in the Museum at Mannheim, but our friend Mr. Francis makes a shrewd guess that most of his length was attained by supplementary vertebræ which never belonged to him at all. Coming down to modern times, we find in

the *Field*, of June 7, 1877, a notice of a pike caught in Lake Constance, and which scaled 130 lbs. ; whilst at Bregentz, in the autumn of 1862, a monster pike was caught, weighing 145 lbs. In the Buckland Museum is a model of a 56 lbs. pike, taken when Whittlesea Mere was drained. The Irish lakes hold fish of 70 and 80 lbs. weight, and probably in some of our large English lakes, which have not been fished for many years, some grand pike will some day be found. You have no doubt all seen our friend Jardine's pair of 37 and 36 lbs. each, but they are small to what he hopes to produce during the coming winter, when my little infant of 22 lbs. will be simply nowhere. Now, with regard to the age of pike, or, indeed, of any river fish, I think a very good approximate opinion may be formed by placing a scale under a microscope and counting the rings on it. I have not observed any notice of this in any work, but it is a very easy way of arriving at some idea of the age of a fish, and I think a tolerably correct opinion can be obtained from this inspection. As to the culinary merits of the pike, there has perhaps hardly ever been so great a diversity of opinion on the value of a fish at different times and places. Towards the close of the thirteenth century we are informed that the price was double that of salmon, and ten times higher than turbot ; in the middle of the following century it occupied a position as one of the chief dishes in High Church

festivals ; whilst a century later a small jack was dearer than a large fowl. Passing to the Continent, the Italians rarely eat them, whilst in some parts of France they are in great demand, as also are those of the German lakes. There is no doubt that a fish from a muddy pond can never taste like one from a clear river, or large, deep lake, and in addition to this, a very great deal depends upon how the fish is cooked ; not so much on the sauce, but on the manner of cooking and the skill of the cook. A fresh-caught pike of five or six pounds weight from the Thames or Avon, properly cleaned, filleted, coated with egg and biscuit-powder, and fried a beautiful golden-brown, is a dish not to be despised by the epicure. As regards his food, very few things come amiss ; he lays quietly amongst the weeds, and, hidden from observation, will keep a general look out for a group of ducklings paddling along, a dabchick or moorhen leisurely swimming past, or a fine shoal of roach or dace ; then, selecting his victim, he springs forth like a tiger from the jungle on his prey, there is a sudden rush and dispersion of the remainder of the little flock, circle after circle forms on the water, and all is again still.

I had a curious instance of this some few years since at Marlow. I was using a live snap with rather a large bait ; working it down with the stream, through the rushes, in rather a difficult piece of water, where if the float deviated

at all from the line of rushes a foul was certain. It had just passed these, and was entering a small clearing in the weeds where an eddy was formed, when suddenly bait, float, and lead were all shot up into the air, and the head of a 12 lbs. pike appeared in pursuit. As the bait fell, it was cleverly caught in the capacious jaws of my distinguished visitor, who found directly afterwards that although my dace looked very attractive in harness, still he "had got them all on" in more ways than one, and certainly in one way that was not at all to his liking.

How many instances there are of pike being choked in their endeavour to swallow at once more than they can manage, I will not now stop to inquire; at Osterly and elsewhere they have been found dead with the head and neck of a swan engulfed in their capacious throats, but, being unable to persuade the remainder of the bird to go down, they succumbed to the inevitable and went over to the majority. Their own family do not escape if grandpa is on the feed, and of this amiable little weakness I had an example only three years since in the Thames. I was spinning for a fish which was estimated to weigh from 15 to 20 lbs. ; I hooked, unfortunately as I thought at the moment, a small fish of a pound or so, just below the habitation of my very estimable though cannibalistic friend ; I did not want to disturb the water, so played my small jack very carefully up till he was within some

nine or ten feet of the punt, when all at once there was a tremendous swirl in the water, caused by the larger fish rushing from a bed of weeds and submerged branches under the bank, and the youngster was seized by his older relative. I let him turn with his prey, when for once there was a display of justice, and the young jack escaped; the hooks of the flight settled firmly into the larger fish, which weighed $15\frac{1}{4}$ lbs.

This propensity of most fish of prey to devour the young of their own particular species is quite as well for the economy of the fish world, when we consider the enormous number of eggs contained in the roe of a female pike.

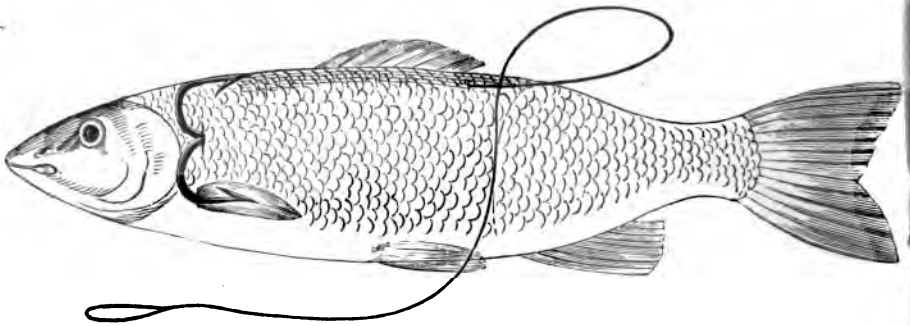
Mr. G. Rooper caught in Loch Awe during the month of October, 1869, whilst spinning, a very handsome female fish of 28 lbs. This was 43 inches in length, and contained nearly 300,000 eggs, weighing 21 oz. In April, 1870, a pike of 32 lbs. was caught in one of the Norfolk Broads. The roe weighed 5 lbs., and contained upwards of 500,000 eggs. The skeleton of this fish is in the Museum of the Royal College of Surgeons. In the same month Mr. Buckland received from Killin, the salmon-fishing station on Loch Tay, a brace of pike weighing together 19 lbs. The head of the smaller fish, which weighed about 9 lbs., was tightly inserted in the mouth and throat of the other as far as the termination of the gills, and they were

gaffed by one of the boatmen whilst struggling on the top of the water. A cast of these pike is in the Buckland Museum.

The Rapley pike, caught October, 1874, weighing 35 lbs., whose age was considered to be between 13 and 14 years, contained over 430,000 eggs, whilst another, weighing 21 lbs., taken at Eastwell Park, February, 1879, had a roe weighing nearly $2\frac{1}{2}$ lbs., and this was computed to have over 200,000 eggs.

After these few preliminary remarks, we come now to the science of pike fishing, and that there is some considerable amount of science and skill required must be admitted by all: there is, of course, such an element as "luck," and I have known some men who really knew nothing whatever about "how to fish," but still come home with good bags, whilst others, perfect masters of the art, were unable to produce a scale. It must be obvious that in a short essay like the present it is impossible to do anything like justice to such a subject as pike fishing; we can but touch on some of the most successful methods, and leave to those of our hearers who we know are good anglers to give us some of their ideas in furtherance of that design. We may divide the art into four heads, viz., spinning, snap-fishing, live-baiting, and trolling. Of these, the most sportsmanlike, as well as the most attractive, is spinning, which means the art of taking pike or other fish with a bait, natural or artificial, to which a re-

volving or spinning motion is communicated whilst it is being drawn through the water. Next to this I place snap-fishing, because it enables the angler to return at once to the water all unsizeable fish which with the ordinary livebait gorge would be killed. The next is live-baiting, which is perhaps the most popular, because it is the most easy mode of fishing, though the live-bait angler runs the chance of the pike dropping the bait after swimming about for five or ten minutes, which they will do if not much on the feed, and, after raising the angler's expectations, he finds the float come quietly up, through the hook pricking the pike's mouth when shifting the bait to pouch it. I do not admire this style, because you have to threadle your fish on the double hook with a baiting needle,

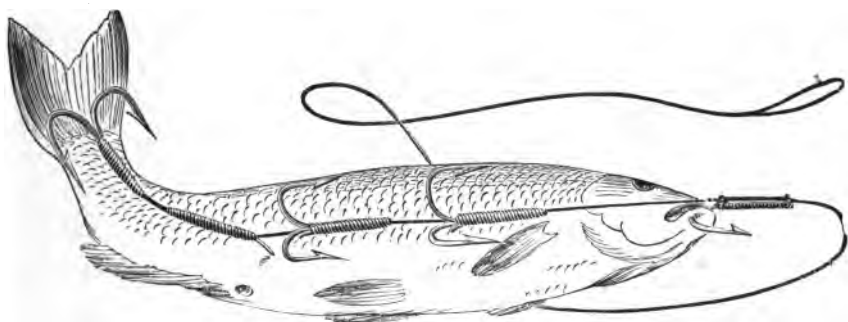


and although fish may feel pain in a very small degree, still there must obviously be a certain amount of unpleasant sensation caused by passing the baiting needle for an inch or two under the skin of

the bait, and I think that in fishing all unnecessary cruelty should be avoided. The last head under which I have classed this subject is—trolling, or dead gorge. This was formerly considered the highest branch of the art, but is open to a similar objection to live baiting with the double hook or live gorge, and that is, that all fish taking the bait, large or small; have to be killed, if they pouch; whilst, unless the fish are feeding, they will often drop the bait after holding it for ten minutes, which occurred to me at Maidenhead only a few weeks since, where I was fishing rather a close bed of weeds with a dead gorge, simply because I could not spin or snap it. I had three runs with no result; in neither case did the pike attempt to pouch the bait, simply held it in his mouth and played with it. I imagine that a pike will furnish a remarkably good example of the small amount of what we should call “pain,” as felt by a fish; how very often they will bite off a hook and be caught directly afterwards. I have had them bite off a gut flight, when spinning for trout, and on throwing again to the same place with a gimp flight, catch the same fish with my lost flight still in its mouth. My opinion is that although if the hook runs into a special nerve they may at the moment feel the sensation, unless there is a continued drag on the hook that sensation goes off, and if a pike bites off the flight he only feels the inconvenience of the hooks

catching in his food till he has broken them off. Starting then with spinning—What is more glorious than to be out on a fine bright winter's day, when a push of water has carried away the decayed weeds and cleared the river of rubbish? You put on a spinning bait so as to revolve as steadily as possible, and without any trouble as to kettles or other impedimenta you can roam in search of your fish. In the Thames, although there are plenty of places where you can spin from the bank, still, as a rule, you will find the best places are on the opposite side to the towing-path, and a punt or other boat is an absolute necessity. With regard to the rod, that in use on the Thames is from 12 to 13 feet in length, but on some lakes and rivers a shorter one of about 9 feet will be found more useful if there are many overhanging trees. The line should be a prepared silk one, not stout, but as fine as is consistent with strength, wound on a light check winch. I am, of course, now speaking of the Thames style, but those who prefer to throw from the winch, as is practised on the Trent, use a very light undressed line on a wood winch, that will run with the slightest touch; these, however, require great care, or the thrower will find that unless he checks his winch directly the bait touches the water, the winch will run on, and his line will be in a happy state of inextricable muddle. The next part of the tackle is the trace, either of gimp,

twisted gut, or strong single gut, with from two to four swivels placed at intervals of about a foot, whilst a field or hanging lead is also used, both to sink the bait and prevent the line kinking. At the end of the trace is fixed the flight of hooks on which to place the bait, and as there are many patterns of this, we will confine our attention to one or two of the best. The one I use



is the old-fashioned flight of three triangles, the reverse hook to crook the tail, and the lip hook, with the addition of the flying triangle on the reverse shoulder of the bait; and although the idea of this flying triangle has been claimed by one or two writers, still the fact remains that I used it some thirty years since when fishing at Weybridge with George Keene, and then it was an old idea, but not so much appreciated as it has been in later years. This is, I think, as good an all-round flight as can be used. In the Midland Counties the flight most fancied is made of three triangles and a lip hook, the middle triangle being hooked in the back behind the dorsal fin of the bait, so as to crook its

back, and the end triangle hangs over the tail. I have sometimes found this very successful. All sorts of artificial baits are used, but a good bright artificial dace is the best. In throwing, the novice should remember that the most successful angler is not always he who throws the longest line, but commence by spinning the water nearest to you, increasing your cast each time to cover all the water within reach, the rate at which the bait is moved being determined to a great extent by the depth of the river or lake, fishing quicker in shallow water and slower in the deeper parts. In some places you may have to raise the point of the rod and use no lead on the trace, so as to skim the bait, as it were, over the weeds. Now in such places as these, a dead gorge is useful if you know of any good fish being located about the spot, and the pattern known as the "weed hook" is the best for the purpose, as you can work it in any part of the sunken weeds without getting hung up or fouled. It is very simple in use, and has a wonderfully lively appearance in the water if properly worked, as the bait is always travelling up and down head first, but still, as I said before, you occasionally miss your fish.

Where there are tolerably clear places amongst the weeds a Paternoster with one hook only, mounted on about a foot of gimp hanging from a swivel, is efficacious, and I have caught some good fish with it, especially when the water has been clearing off after

heavy rain. Use about a yard of strong salmon gut, with the swivel projecting from it about a foot or so from the bottom. I prefer a swivel to a simple loop, as it allows more play to the bait, which should be hooked by the lips; and always attach the Paternoster lead by a small loop of very fine silk; then if the lead is caught between heavy stones you run no risk of breaking the line, but you will only lose the lead.

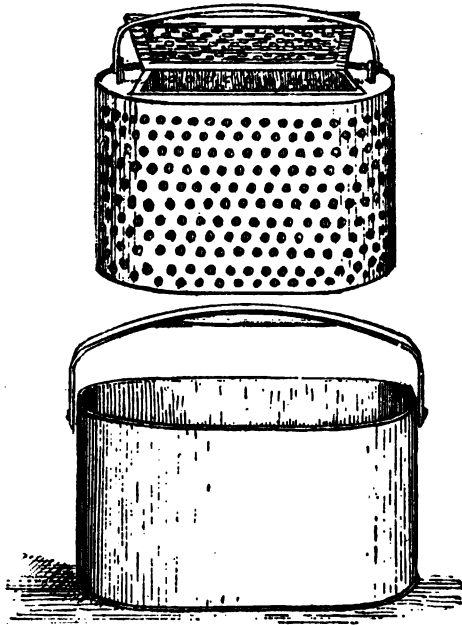
Passing now to snap fishing with a float, the two most useful patterns are those known as the Jardine and the Otter. The last is formed of a triangle, the small hook of which is passed under the back fin of the bait, whilst the single hook, tied at a



sufficient distance up the gimp, goes through the lips, and if it is used in a stream, for working through the weed beds, this will often be found best, as the bait comes back head first, and can be guided better through the weeds than the Jardine, where the bait is suspended by the triangle in its back, whilst the other triangle is under the pectoral fin; in this latter the bait comes back crossways

in the water, and can rarely be guided so well, but in still water I like it perhaps better than the other.

With regard to the form of kettle in which to convey the baits, I think the Improved Bait-carrier is the best. It is made with an inner can of perforated zinc, and when at the water side this part of the carrier, containing the baits, can be taken out and placed in the river so as to let the water run through.



Now, with regard to striking, what a number of theories are propounded, one theory even going so far as to insist on two strikes being given in case one was not enough to fix the hooks. I fancy the result

of the second strike would be to cause a contrary effect. As a matter of fact, I think that in spinning you instinctively strike on feeling the bait seized ; but with regard to the other cases, such as paternostering, or snap, strike smartly in proportion to the fineness of your tackle, and hold him for a second or two, so as to make sure that the hooks go in beyond the barb ; don't let him come up to the surface if you can help it till you are ready to land him, and whatever you do never let him have a slack line. Keep him out of the weeds, and have him in the net as soon as possible. A big pike is as tricky as any fish that ever swam. One pike-fishing friend of mine some time since said that he had an idea that the big fish were cunning enough to understand that the best way to get rid of the hooks was to rush direct into a heavy bunch of weeds, and gripping this with their teeth they chew the hooks into the weeds, so dragging them out of themselves, for he said that he always found weeds on his hooks after this performance. My 22-pounder tried to do this, and fought hard for the weed-beds ; when he found this would not do, he jumped out of the water like a salmon and tried to drop on the line, then he went to the bottom and sulked ; at last he gave it up, and after some grand rushes, for he fought to the last, I steered him into the net, and we soon had him safe in the well of the punt.

Salmon fishing may be exciting, but is hard work, especially if you are towed up and down a rocky river by a monster that you cannot quite get under control. Trout fishing with the finest of gut casts and the tiniest of midges may be exciting too, but for a really enjoyable day's sport, what can be finer than a good day amongst the pike in a warm corner, where there are just enough weeds to give a fair chance to the fish, and where you are expected to turn in again, as in some waters with which I am acquainted, all fish under six pounds.



THE SCIENCE OF ANGLING.

A PAPER

READ BEFORE

The Gresham Angling Society

BY

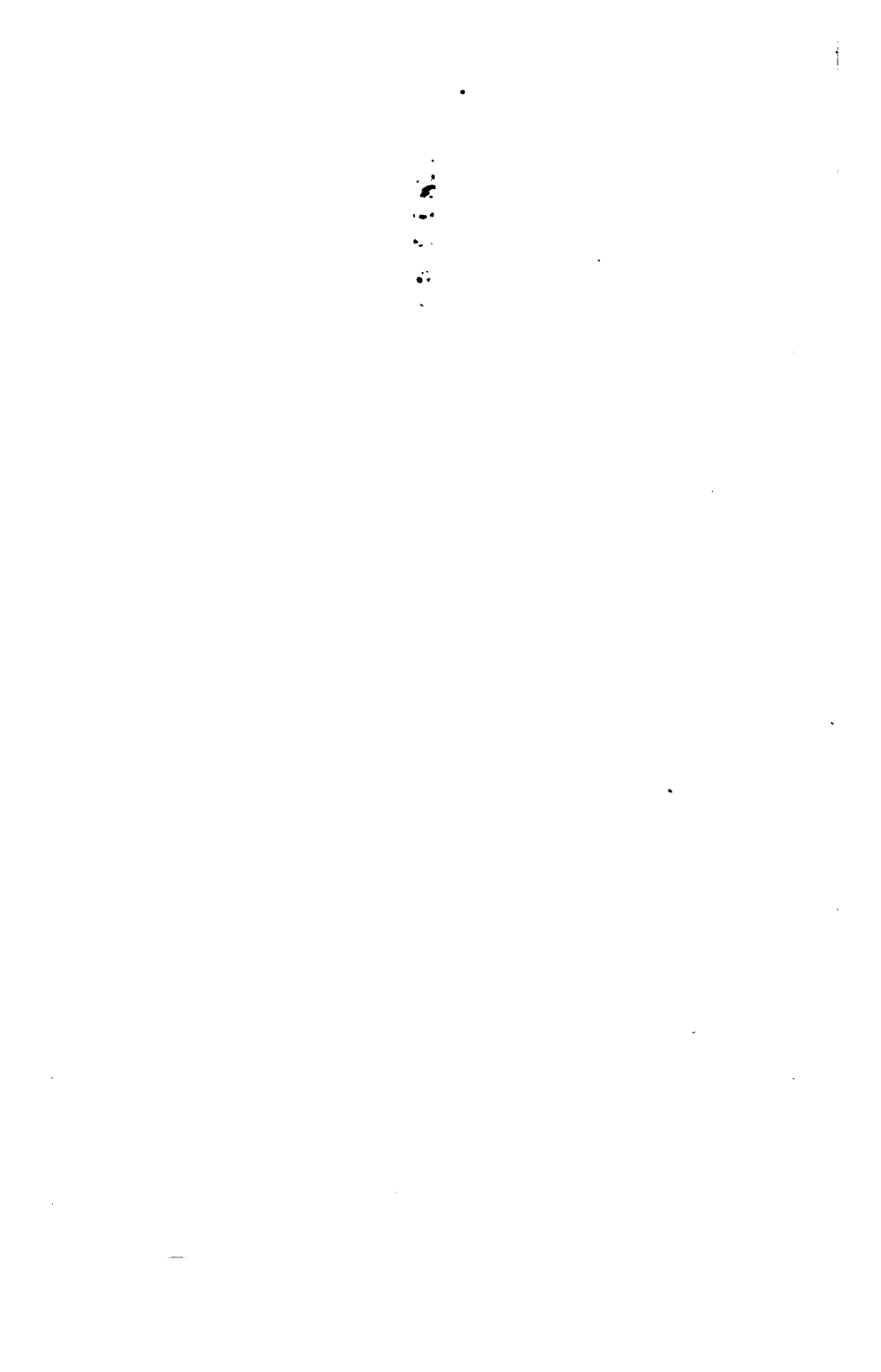
J. P. WHEELDON.

AUTHOR OF "ANGLING RESORTS NEAR LONDON." ETC., ETC.

NOVEMBER 24th, 1881.

LONDON :

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I dedicate this Paper to my brethren of the rod,
and shall be amply satisfied if I think that any of
its sentiments may be remembered at a time when
the hand that penned them is at rest.

J. P. W.

THE SCIENCE OF ANGLING :

A PAPER READ BEFORE THE GRESHAM ANGLING SOCIETY BY
J. P. WHELDON.

MR. CHAIRMAN, VICE-CHAIRMAN, AND GENTLEMEN :

It would be nearly impossible, within the limits which I could hope to claim from your indulgence, to enter at full length into all the devious paths which a careful or very thoughtful consideration of my subject would inevitably open up. Looking cursorily at the text of my paper, it seems to me that the deduction arrived at from the use of the word "science," as applied either to the consideration of a special art, an abstruse study, or, as in this case, a matter looked upon in the light of a simple amusement only, is that which teaches an honest student all that he can hope to learn about his subject, after he has grounded his knowledge upon practical demonstration, thought over it earnestly, and then made it reducible to that which he meets with in every-day practice. Thus it is that by a habit of thoughtful observation, practised without stint upon every possible occasion, the humble medical student develops into the scientific surgeon, or into that other wonderful result of deep

research and study, the physician, who probes to the very root of a mysterious disease, hidden to all save, it may be, to the curious deductions drawn by his cultured brain. Thus it was that the names of such men as Michael Angelo and Peter Paul Rubens grew into gigantic monuments of artistic fame. Then, descending to our own time, earnest study, married to deep thought, gave birth to a Faraday, a George Stephenson, a Brunel, while a deep-seated love of animal nature, in all its varying phases, produced, as the result of cultured labour, the workings of the great brain, the thoughts of the almost womanly heart, that once pulsated in the bosom of poor dead and gone Frank Buckland.

Having thus, perhaps very imperfectly, sketched out that which I understand as forming the basis of a "science," I will now proceed with sundry notions, and endeavour to show how I think that word may be applied as the distinctive character of a time-honoured amusement, beloved of most of us. I propose to do so by dealing shortly with a few branches of the angling art looked at from a practical standpoint, adding thereto certain thoughts of my own, founded upon the poetry of the craft, and which appeal more deeply to those softer and perhaps weaker elements which form component parts of our common nature. These sentiments, not easily defined, are, I believe, prompted by, and eminently distinctive of,

that craving for solitude, beautiful surroundings, and the pure religion born of the ripple of the waters, inculcated by the subtle pulsations of the dark, dim forest, and which finds root, flourishes, and grows apace in the bosoms of certain sympathetic men. In my opinion such feelings, vague and indefinite as they may be, go far to make those men honest and simple anglers and true lovers of that sport whose chiefest charm would seem to be that it takes the man of tired hands and weary brain far from the haunts of the busy crowd of bees, everlastingly swarming round the hive of commerce and trade, and whose sweets are chiefly those of pounds, shillings, and pence.

I need hardly dwell at any length upon the antiquity of our common sport. You, who have doubtless found solace in many a weary hour from the sweet friendship of books, know that not only were those strangely mystic people, the Egyptians, simply catchers of fish, but that, in their way, they were to a certain extent skilful in the use of the angle. Homer, Pliny, and Oppian each adds his quota to the history of the craft, bearing witness that, even in their day, they knew of certain "fools" who were amply content to sit at one end of a pole, while they dangled a thread and a worm at the other. Then how frequently does history repeat itself. Shakespeare tells us in his own matchless manner of how Cleopatra,

addressing her royal lover Antony, said, "Give me mine angle ; we'll to the river. There, my music playing far off, I will betray tawny-skinned fishes." Further on, and doubtless anticipating her sport, as some of us are wont to do nowadays, to our great subsequent grief, she adds, "I'll draw them up and think them every one an Antony, and say, ah, ah, you're caught!" Sly Antony, it is said, tired with his lack of sport, sent his diver down to attach divers fishes to his own hook. I doubt one or other of us have done something pretty much of a muchness to account for an empty creel before now, rewarding the diver with a certain largesse placed in the palm of a ready hand. But let that pass. Cleopatra bowled Antony clean as a whistle. Next day, according to ancient tomes, they went again a-fishing, and she, the tawny jade, sent down her own special penetrator to the bottom of the river, and, says Plutarch, told him "to fix upon his hook a salted fish, even one of those which were brought from the Euxine sea." I can well fancy the state of Antony's feelings, but am assured they were not a whit more poignant than my own as a little lad, when, after I think a week's patient, yet fruitless angling in the water-butt attached to the rear of my ancestral halls, my own dear father stood confessed as the prime instigator and mover in setting a heartless trap, the result of which made me at early dawn the proud possessor of an undeniable bloater.

It is certain that the first book in the English language relating to the sport of angling was that written by the Prioress of St. Albans. This appeared in 1486, and contained certain instructions on the art of "Fysshynge with an Angle." Then followed Leonard Mascall with an angling treatise in 1590. After that came Barker with another essay in 1651, followed by dear old Walton's sweet thoughts and reflections, first published in 1653. Since then he has had many followers, but nothing in the literature of angling will bear comparison with that breath of purest poetry and honest sentiment which glows in every line of the good old fellow's musings. He it was who, while sitting under the shadows of a broad beech, quaintly and beautifully fancied that the birds in the adjoining grove seemed to be engaged in a "friendly contention with an echo, whose dead voice seemed to live in a hollow tree near the brow of that primrose hill." Can anything be more simply beautiful? Pure, indeed, must have been the heart of the child-like, simple-minded man who could imagine such a chastely beautiful idea. One may well believe that as he drank his "draught of red cow's milk," he was like to say, in spirit, and with thankful heart—

"Hail ! bless'd estate of lowliness ;
 Happy enjoyments of such minds
 As, rich in self-contentedness,
 Can, like the reeds, in roughest winds,
 By yielding, make that blow but small,
 At which proud oaks and cedars fall."

For a brief space let imagination wander back, and think of the rude, almost barbarous, implements of the craft in use at the time when, in the fifteenth century, Dame Juliana Berners penned her treatise on "fysshinge," when Walton taught his scholar the mysteries of his order as they walked by the river side, or when cunning old Nobbes, "the Father of Trolling," first descanted on the use of the dead gorge. Referring to the *Boke of St. Albans*, it would appear that hooks were then attached to bits of chain cable, while the "renninge" or running lines, if in use at the present time, would simply make a modern angler shudder with very horror. Think for one moment, while remembering that the fair Prioress suggests the use of a stout ash pole for "catchinge ye roche," of the difference between the equipment of a roach fisher of that day and of the present. The roach fisher of the Lea, old Izaak's favourite stream, is to my mind not only the best roach angler on the face of the earth, but in ninety-nine cases out of a hundred the very soul of neatness and nattiness with regard to his rod and tackle. In lieu of the "stout ash pole"—how on earth they ever hit'em with it I know not—he uses a beautifully balanced rod, tapering from butt to point in perfect proportion, with a spring true as the rebound of a rod of taut steel, accurate and even as clockwork itself, while the whole weapon is, comparatively speaking, light as a feather. Observe

his delicate line of single hair, his float so exquisitely shotted that the mere drag of a floating leaf or the clinging touch of a bit of weed instantly pulls it under, the shot placed symmetrically and in perfect order, while his fine wire hook is not much thicker than an eyelash plucked from one's mistress's orb of jetty hue or eke of azure blue. How has this perfect result been attained? I answer, because thinking minds have applied themselves so closely to this special branch of angling that roach fishing has become an absolute science in itself. I venture to say that there is not a man present here to-night, unless he has graduated on the Lea or the Colne, and carries the "hall mark" of his prowess in the shape of a well-known angling name, who could hold a candle to any one of the better class of Lea roach men. They are marvellously skilful. Cunning beyond compare in every trick and fence of the angling school—masters of such dodges as ancient Izaak never dreamt of in his philosophy; and I have the assurance to assert that the man, whoever he was, who first discovered that wondrous wrinkle of the bit of groundbait over the paste, was not only a consummate philosopher and an artist, but a benefactor to his fellows of such an extraordinary calibre that he was deserving at the very least of a tomb in Westminster Abbey.

Again, just glance for an instant at the pure science

and craft displayed by an adept with a blow line. What, I wonder, would Nobbes or Walton have said could he have seen such an episode as this. Yonder there, on the farther side of the stream, stands a belt of tough old withies, crabbed, crusty, and cranky looking as old Johnson himself, with all his ponderous pomposity. A fringe of roots, strong and unyielding as iron, forms a backing to the forest of stout, well-nigh unbreakable reeds and water-flags. Outside those reeds, and the water swirls swiftly past, millions of dimpling eddies chasing one another continuously, and smiling up at the blue sky and fleecy banks of white clouds slowly sailing overheard. Here lie scores of great leather-lipped chub, with scales as big as shillings, and each one glittering with its gold and silver sheen. Why, hang it man, one can see them from the bridge, huge, labbing old scoundrels, with pinky rims to their great lips, which each smacks unctuously with an oily sort of "plop" in the early, misty June morning, as he lazily rises at a fat green caterpillar, which, dozing up among the trembling willow-leaves, has just tumbled off his perch, or at an unfortunate lovelorn bluebottle trying to commit suicide. Useless, all useless, to try to gain access to that meadow. Firstly, the old squire, with a face like a Ribston pippin, a martyr to the gout and chalk-stones in his knuckles, and, moreover, whose only daughter has just run away with her groom, "will

see you d—d first, sir ;” and, secondly, there is a lively species of bull philandering around that bit of glebe land, whose special mission on this earth is known to be that of “prodding anglers,” if not wisely, only too well. Well, “what’s to be done ; it is perfectly plain,” to quote my Lord Tomnoddy, “that they cannot well hang the man over again,” and neither is it desirable, my friends, to try and ramp across that pasture. “Try ’em off the bridge,” says excitable little Tommy Toodles, member of the Brazen Barbels, “with a Nottin’am float and a bit of greaves.” ’Tis done, but with gin clear water, and the bridge itself not a dozen yards away from the best bough, the result is not too much sweetness. By and by crafty old Splorger wanders past the chub hole, his footfall as light as a poacher’s on a shiny night, or a gentleman going a burgling in the wee sma’ hours. He has a long light rod over his shoulder, pliable as a whip, and attached thereto a gossamer line of filmy floss silk. Fortunately the wind blows right across the stream, and towards chubby’s stronghold. At the end of this filmy line is a stout, yet tiny hook, whipped on to a single strand of fine gut, and, hang it!—yes, that artful old Splorger has got a store of the loveliest and juiciest bluebottles, with great, fat, oozy sterns, all alive O ! in a big pill-box. Kneeling among the weeds and tall grasses at the river’s brink, where the dragon-flies bask lazily in the sun, he

attaches a rare specimen of an insect Banting. Then with rod erect, and his gut line held in the podgy, yet deft fingers of his left hand, he awaits for a breeze. "Plop" goes a great chub, rising after an adventurous gnat. Plop! plop! The one noise is caused by another perfectly excruciating sort of chub, while a water rat, startled out of all sense of propriety, is accountable for the second. Presently the westerly wind fans the man's brown, sun-tanned cheek, rippling the still, soft-flowing water. Up with the point of the rod, and the soft silk bellies out into a splendid curve. My heart alive! old Splorger drops that perfectly irresistible bluebottle—he does indeed—into the very centre of the rings left by that last rise. The next instant he is fighting a terrible battle with a big fish, every round fought by means of a thread. He kills him too; and, gentlemen, I venture to think that that little performance is a part of the science of angling.

I would ask, and at the risk of wearying you, to turn for a moment and see what long consideration of the art or science—for assuredly it is one or the other—of trout-spinning has done for that single branch of the angling craft alone. I can conceive nothing more delicately artistic than the outfit of a really good Thames spinner, or anything, indeed, in the practice of the higher branches of the sport, salmon-fishing included, which so completely stamps an undeniably

good man. Look at the exquisite delicacy of his running line, his reel with just so much tension on the spring, and that alone, as will prevent the line overlapping with the rush of a game and determined fish. Then the rod, with its power, its spring, its perfect balance, its developed principle of give and take, putting one in mind somewhat of the wrist of a beautiful and high-born woman. It is white, soft, yielding, and delicate is that wrist, yet it can at will stiffen and become rigid as a thin bar of steel, giving way and breaking by brute force alone. And the trace—ah, that lovely bit of round gut, and those tiny, well-oiled swivels! Is there a man here that can say it is not a form of pure and undeniable science when an angler kills a big and powerful fish by such means? Look at the trout-spinner as he stands half cowering behind the buttress of the weir, or sheltering himself as much as possible behind the paddles of the rymers. Below him thunders an avalanche, a torrent of white, glistening, ever-changing, yet ever the same, foam-flecked water. Far as his eye roams, the surface of the weir pool is one dancing mass of tumbling waves, save where the eddies, seething and boiling at first, seem to subtly glide back towards the weir head, an oily black mass of trembling, heaving water. Immediately below, and it seems as if he were looking down into the depths of a mighty bowl of Roederer just uncorked,

and one swirling mass of upheaving foam and bubbles. Here lies the grand Thames *fario*, and just imagine, if you please, under such circumstances, the fierce rapture of a run. With one upward dash, swift as that of a bolt from the thunder-clouds hanging purple blue overhead and shadowing the water, and the great trout has your tiny bleak firmly fixed in his jaws. Mind you, his first move will be to dash clean under the sill of the weir. Once under, recollect, and the victory is not yours. You must hold on like grim death, withal the touch of an angel. If you defeat his little game, he flies upwards and out to the sunshine yet once more, and then, if he does not break you by falling over the line, he goes down the pool with the pace of an express engine. Do not forget that your angler, all this time, has a couple of feet only, in the shape of the breadth of the weir beam, between himself and eternity. He has to kill that grandly game and courageous fish with a torrent roaring and boiling beneath him, so that, I take it, is part and parcel of the science of angling.

I will deal now with some purely speculative theories, which I think may be applied to him who thinks as he runs by the way, and so makes his amusement take a higher and more intellectual position. In the first place, I believe that the practice of angling has ever taught, and will always teach in the future, great moral lessons. I picture to myself

a man who loves angling and the sweet retirement of the wooded brakes through which the trout stream winds its sinuous way, or the solemn silence of the far stretching country, midst which the broad bosom of the river glides, sustained through a week's persistent toil by the hope of a sweet and pleasant day towards its close. I may be blamed for suggesting the day of rest as an opportunity, which is taken by thousands for the sake of their peaceful recreation ; but, bear in mind, that to many who are obliged to labour with thew and sinew for their offspring, it is their only one ; and that the space of one little day taken from the working hours of the week, means so much loss of the inevitable necessities of life to the needy poor. To such a man I say, "Go in God's name on the Sunday, and drink in that bountiful religion which is taught by the whispering of the reeds, the soft ripple of the waters, and the song of unseen birds." There, amidst the mysteries of sweetest solitude, how is it possible for you or I to gauge the depth of the reflections that sink into man's bosom ? How dare you or I say that that "Sabbath breaker," as the Reverend Mr. Stiggins may choose to dub him, has not more true honest religion, more thankfulness, a sweeter and purer sense of gratitude and entire restful repose than he who dons his Sunday-go-to-meeting broadcloth, and walks abroad, smug and self-satisfied, to the sound of the church-going bells. God

judges men, at least such is my belief, by their lights, and by their honest sense of right and wrong. Granted, that the Sunday fisherman does offend propriety and society. It may be that, as he muses by the river side, sincere grief and sorrow for past errors chastens him, and a sin may be blotted out in the Great Ledger. Who knows ? But whether or no, I can well believe that a kindly hearted fellow, as indeed most anglers are, goes home refreshed, invigorated, purer of heart and mind from his vigil by the murmuring water. Listening to a thrush, whose flute-like voice pulsates with ringing melody through the neighbouring copse, he may, perchance, feel some of the beautiful imagery of the poet who said, "Lord, what music hast Thou provided for the souls in heaven when Thou affordest bad men such music on earth."

If, then, such happy results spring from a prosecution of the science of angling, how true may be those delightful sentiments expressed by Mr. Westwood in the *Newcastle Fisher's Garland* for 1863. An old angler lies dying, his kith and kin stand round with moistened eyes, and after he has had his couch drawn to the window, so that he may see his dearly-loved trout stream, he says, with a mind free from fear of the last dread journey :—

"Now place my rod beside my hand—
 I live in days gone by,
 I climb the steeps, I move the deeps,
 I throw the cunning fly ;

Wild whirrs my reel, full grows my creel,
 Oh son ! oh loving daughter !
 In maddest dream, was ever stream
 Could match with Coquet's water ? ”

Gentlemen, in conclusion I would quote Venator and say, “ When you would beget content and increased confidence in the power and wisdom and providence of Almighty God, then walk the meadows by some gliding stream, and there contemplate the lilies that take no care, and those very many other various little living creatures that are not only created but fed (man knows not how) by the goodness of the God of nature, and, therefore, trust in Him. This is my purpose ; and so let everything that hath breath praise the Lord. And let the blessing of St. Peter's Master be with mine.” “ Aye,” says Piscator, “ and upon all that are lovers of virtue and dare trust in His providence, and be quiet and go a' angling.”

Gentlemen, I thank you much for your kindly welcome. I am afraid I have wearied you, but if I have done so my excuse must be that I wax enthusiastic at odd times about a science or pursuit, call it as you will, which sweet Shakespeare seems to have had at heart when he says—

“ And this our life, exempt from public haunt,
 Finds tongues in trees, books in the running brooks,
 Sermons in stones, and good in everything.”

DARLING AND SON,
MINERVA STEAM PRINTING OFFICE,
35, EASTCHEAP, E.C.

FISHING AT CONNEMARA.

A PAPER

READ BEFORE

The Gresham Angling Society,

BY

JAMES CALLAGHAN,

ON THURSDAY, 8TH JUNE, 1882.

C. S. BENTLEY, ESQ., F.R.M.S. in the Chair.

LONDON :

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MR. CHAIRMAN AND GENTLEMEN,

The paper which, with your permission, I propose to read this evening, treats of a visit which I and a London friend made to Ireland in August last, for the purpose of angling.

At the time we were thinking of leaving London, the Green Isle was not engaging quite as much attention as it does now. Still, agitation was rife and numerous arrests were being made, indicating disturbance in various parts. The newspapers were full of alarms, as usual, and it was thought by some of our advisers at home that we were running great personal risk in selecting Ireland, and the West especially, for our holidays. Nothing daunted, however, we made up our minds to pay a visit to Connemara. We had heard of its wild highland scenery, of its numerous lakes and rivers, and of the grand sport which they were sure to yield; so, packing up our rods and other *impedimenta*, we found

ourselves at Euston just in time for the Saturday evening mail. You are probably aware that the London and North Western Railway service between London and Dublin is an admirable one, whether we regard the punctuality of the mail trains, which perform a journey of 264 miles in about $6\frac{1}{2}$ hours, including stoppages, or the comfort and excellence of the steamboat arrangements. There are four magnificent steamers belonging to the Company which convey the passengers and mails from Holyhead to Kingstown, and *vice versa*. These large and elegantly equipped vessels (called after the four provinces of Ireland) are, weather permitting, as exact as the trains themselves, and usually make the run across Channel, which is 64 miles, in rather less than four hours.

Reaching Dublin about 8.0 a.m. a short drive across the city brought us to the Broad Street terminus, from which we took train to Galway. We arrived at the Railway Hotel, Galway, on Sunday evening, after a satisfactory journey, and just in time for dinner.

On Monday morning we strolled through the town and wended our way to the bridge which spans the Corrib and adjoins the fishery. Here a sight presents itself which cannot fail to gladden the angler's eye. On looking over the parapet of the bridge into the shallow rapids beneath, we could count hundreds of salmon of all sizes waiting to ascend the river. As we saw them, they lay one here, another there, sometimes two,

sometimes as many as three and four, side by side. In one instance I observed a group of five fish; the two outside salmon were the largest, and might have weighed 20 lbs. or more each, two others perhaps 12 to 14 lbs., and between these four fish was one little fellow who might be 5 or 6 lbs. at most. I thought it curious that this small fish should occupy the centre, and I must suppose he was on good terms with his big neighbours, who to all intents and purposes were taking the kindest care of him.

After feasting our eyes on this glorious show of salmon, we began to think how pleasant it would be if we could only get a cast amongst them. We soon found that we had only to place ourselves in the hands of the well-known piscator, Nicholas Brown, who has charge of the fishery, and that for the consideration of 10s. per day we could fish, with the right of retaining one-third of the fish taken. This did not exactly signify that if you caught one salmon you could cut one-third of him off and call it your own, or if you caught no fish at all that by some curious process of calculation you should apportion the spoil in the same manner, but it meant that in the event of, say, one or more fish being taken, you would either have the power to buy two-thirds of the weight at the ruling price of the fishery (then 6d. per pound), or you could deliver up the fish entire, and they would allow you one-third of its value. We were soon

provided with rods and tackle by our friend Nicholas, than whom, by all accounts, there is no better salmon fisher or fly-tier, and between the hours of ten and twelve we killed four salmon of $6\frac{1}{2}$, $7\frac{1}{2}$, $7\frac{1}{2}$, and 8 lbs. This was only a small performance, considering the number of fine fish in the water ; but we had only a couple of hours to spare, as we had to get back to the hotel, and catch the afternoon steamer for Cong *en route* for the West. Moreover, it was our first essay at salmon fishing ; neither my friend or I having wielded a salmon-rod before. I must say that I was astounded at the strength and power of play of these small salmon. Never having hooked the king of fish before, or felt his regal power, it seemed as much as I could do to hold mine in the rapid water, and my friend, to whom the lion's share fell, was greatly delighted with his success.

At 2.0 p.m., after sending our fish to London (they pack and forward daily from the fish-house), we had luncheon at the Railway Hotel, and then got on board the steamer "Lady Eglington," which took us up the river and across Lough Corrib to Cong. This trip was very pleasant, the scenery around the lake, which is twenty miles long by from two to ten broad, and thickly studded with islands, being most picturesque. At Cong we had a glimpse of the celebrated Abbey, with its ancient ruins, and also the beautiful residence and estate of Lord

Ardilaun (late Sir Arthur Guinness); but wishing to hurry forward, and having arrived rather late in the day, we started first thing in the morning and therefore did not see much of this interesting place. The drive from Cong to Leenane (which was our original destination), about eighteen miles distant, was most enjoyable, especially approaching Maam, when the Connemara Mountains come into view. Here the most singularly wild and uncommon scenery presents itself, different to everything previously seen on the journey. The eye rests chiefly on waste uncultivated lands topped with coarse grass and heather, with hardly a human habitation in view, the dark precipitous mountains frowning upon the gloomy plain, giving it a weird and lonely aspect which must be seen to be imagined.

I cannot, gentlemen, conceive, nor can I get any one to tell me, why it is that some of this vast extent of waste land cannot be reclaimed and made productive. I suppose it is left uncultivated because there is not capital or enterprise in the country, or because both these necessary ingredients will not combine to do it. I was told, however, that Mr. Mitchell Henry, M.P., of Kylemore, made the experiment a few years back on some waste lands adjoining his residence, and, although attended with great expense, the scheme was successful, and he has been since growing corn and other products on these waste lands, and is

getting back his outlay rapidly. Then, again, it is well known that those huge mountains which make everything look dark like themselves are possessed of vast mineral resources, which if only developed would doubtless yield wealth, ultimately, to those who would undertake the work. Why Government would not grant money to reclaim these wild and waste districts, and to explore the depths of these Connemara Mountains, I do not know. To my mind such a course would be a great boon ; it would afford employment to numbers of the poor and starving, it would yield the Government a certain return for its money, and ameliorate the condition of this the most desolate and forsaken portion of the Island.

But, gentlemen, angling is essentially my theme, and not the reclamation of waste lands and mining operations. We have now reached the comfortable hotel at Leenane kept by Mr. McKeown, whose civility and attention I must not fail to notice, everything having been done by him and his attendants to conduce to our comforts during our short stay with him. We were, however, mistaken in our expectations of angling at Leenane. We came with the particular intention of fishing, but found it would have suited us better had we brought our *guns*, the shooting being more within reach, and, from what we could see, practically unlimited. I don't know how many acres of mountain land Mr. McKeown has at the disposal of his customers.

I know that he had 10,000 acres, and I am not certain that it was not 20,000 acres, but for my part I am satisfied with 10,000 if the shooting is good. These Galway and Connemara mountains hold an abundance of game, chiefly grouse and blue hares. While we stopped at Leenane, two or three gentlemen from Galway, who were shooting, brought in on their second day twenty-three brace of grouse and twenty-seven hares. They said the grouse were plentiful, but very wild (most likely the sportsmen's shots had a similar tendency) or they could have made a bigger bag. Of the hares there was evidently a profusion, and I should say they are as thick as rabbits on these mountains.

Turning again to my subject, we fished two days on the Erriff, and a small mountain stream, but without much result. The Erriff is a fine salmon river, and it holds, they say, some good trout, as most salmon rivers do. Our landlord, however, was called to Dublin, and we had no one to guide us as to the fishing. We procured the services of two labouring men to act as our gillies, but they knew very little about the water, and I am sure nothing whatever of fishing. In the evening, speaking with a gentleman at the hotel, we said we made the long journey in order to get some good fishing, but did not seem to be in the right groove. He said at once "Why not go to Ballinahinch Lakes. At Glendalough you will get fishing to your heart's content, and

plenty of people there to guide and help you." "Thank you," we said most cheerfully, and the next morning saw us on the car, doing another seventeen or eighteen miles drive to Glendalough.

This was the most agreeable drive of all, especially as we approached the lakes, where the scenery becomes really striking and beautiful. You still have the dark heather and the steep huge mountains in view ; but these lakes, with their many islands covered with trees and vegetation, light up the scene, and form a picture which is most charming and acceptable to the sight. Skirting Loughs Inagh and Derryclare we soon arrive in sight of the hotel, and here another change manifests itself immediately. We enter by the lodge gate, through an avenue of trees, and fancy we have suddenly trespassed on some gentleman's estate, so lovely and secluded is the spot.

The hotel, which was formerly the residence of a Protestant Dean (I am glad the monks cannot be charged with having *all* the good fishing places to themselves), is a handsome, white castellated building, situate on the margin of Lake Glendalough. It is encompassed on one side with wood, and stands in the midst of sublime scenery. We found here, as at Leenane, all the comforts and attention of home, at the same time that we were in the centre of a large and important fishery. We were not long making friends with Mr. Steele, the head keeper, who took a

good deal of trouble with us, and found that we had no less than five lakes and a splendid river to fish upon, at a cost of 10s. per day, or 50s. per week, all of them abounding with trout and salmon. The boats used on the lakes are rather large and heavy, and it is usual to employ two men to work them. These men are always at hand and glad of employment. We were fortunate in securing the services of two whom I shall always be pleased to recommend. We found them both intelligent and hard-working, and most anxious to show us sport. The regulation charge which these poor men are allowed to make is (notwithstanding the above advantages) a paltry pittance—two shillings per day.

We had five days fishing at Glendalough. Our chief sport was with the sea-trout, of which we generally got fifteen or twenty per day. On one day we killed twenty-seven of these fish—sizes varying from a pound or more to $2\frac{1}{2}$. We rarely got one under a pound, and as these fish were fresh run from the sea, and all caught with the fly, they gave us excellent sport. I might add that we caught also a few charr, and hooked two salmon one day with the sea-trout flies, one of which might have weighed 10 lbs., but did not succeed in landing either, although my friend had his on for quite ten minutes, the tackle being fine and the small trout-flies giving way.

Before leaving Glendalough, I should mention, when

you are fishing these lakes (and I hope you may do so soon), and that happy half-hour for luncheon approaches, do not omit to get your boatman to land you on one of the pretty little islands, and to cook a fresh caught trout or two as an accompaniment to your repast.

These sturdy and obliging boatmen will collect some pieces of dry wood and light a fire in a few moments in the crevice of a rock, and, with two or three cuttings of green holly to serve as a gridiron, will cook your trout in a way that would rival a Francatelli, and with a savoury satisfaction to yourself and company which must be felt to be appreciated.

On returning *viâ* Galway, we had a day's trolling with artificial baits on the river and a portion of Lough Corrib. Strange to say, although both possess salmon, trout, perch, and pike *galore*, and we used the very finest of tackle, we did nothing whatever on the lake, and we only got five small jack at the Galway end of the river, the largest weighing scarcely $2\frac{1}{2}$ lbs. There must be surely some monsters where these small fry were. As a proof of that, we saw some local spoon baits of extraordinary size, fully three times as large as those used on the Thames. We should have remained a few days longer and given the big ones a turn, but had to pass the week which was left with friends in Dublin, prior to our return to the modern

Babylon. Altogether, gentlemen, we had a very enjoyable stay in Ireland, and I would advise my angling friends in search of sport to go and do likewise at the first opportunity.

I wish it were possible to close this paper (already long enough) without in some way alluding to the distressing events which have occurred in Ireland lately, and which have shocked and horrified all right-minded men and women in both England and Ireland, and I might say all over the globe as well. I only pray that the perpetrators of those foul and brutal murders, though they have so long evaded their pursuers, may yet be unearthed and brought to justice. Not that I am a believer in man's revenge, for that should rest with a higher Power, but because the capture of these wicked men will be hailed with joy by the Irish people, whose hopes they have for the time frustrated, and whose hearts they have shrouded in gloom.

Happily, gentlemen, anglers as a rule are not burthened with the weight of politics. Their desire is rather to shun the noise and turmoil of life, and seek in nature's book that repose and contentment which their gentle pursuit affords, and which are not to be found in the councils of men.

Doubtless the sad state of Ireland arising from these deplorable events will deter many anglers and sportsmen from visiting the country, at all events

during the present year. I do hope, however, that this feeling will soon die away. No one who has visited Ireland and knows its people has any dread or fear of molestation. They are always too ready and willing to show kindness and hospitality to those who go among them, and especially to those who visit the country for the first time. Pat is by no means the black sheep that he is painted. With all his faults, and despite the teachings of certain newspapers, he is neither a born cut-throat nor a savage, and he has a deal too much sagacity to behave like one or the other when his true friends come to see him. Though given to be pugnacious and troublesome at times, one of his peculiarities is that he rarely if ever quarrels with his bread, even though the oleaginous compound be wanting. Only go to him with a kind face, and above all a good heart, and take with you a well-filled purse, and he will be at home with you directly, for unfortunately there are many aching hearts and many empty pockets at present in some parts of the Isle.

Gentlemen, I thank you for your kind attention. I intend fishing other parts of Ireland (D.V.) by and bye, and will give you my experiences of them, but I think of all places an angler could choose there is none where he would feel more contented and find more enjoyment of sport than at the Ballinahinch Lakes. I would advise you, if you desire a really wonderful change of

scene, and to combine the most delightful of drives with first-class fishing, to pay the Connemara Lakes a visit, and by all means to make Glendalough your headquarters.



DARLING AND SON,
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SOME PRACTICAL OBSERVATIONS
ON TROUT CULTURE.

A PAPER

READ BEFORE

The Gresham Angling Society,

BY

HAYMAN CUMMINGS, F.R.H.S.,

ON THURSDAY, 7TH SEPTEMBER 1882.

LONDON

DARLING AND SON, MINERVA STEAM PRINTING OFFICE,

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SOME PRACTICAL OBSERVATIONS ON TROUT CULTURE.

DELIVERED BEFORE THE GRESHAM ANGLING SOCIETY, SEPTEMBER 7TH, 1882,

By HAYMAN CUMMINGS, F.R.H.S.

“ The artificial breeding and rearing of fish is the easiest thing in the world ; ” “ It is of all things in the world the most difficult.”

Both these statements have been made in all good faith, and both are true ; the truth of both turns upon the conditions under which the cultural operations are carried on.

The water used—its quantity, qualities, and temperature ; the attention of the culturist and his assistants—their cleanliness in all dealings and departments, or the want of these, are important factors in the venture.

Fish culture is the easiest thing in the world in theory ! in practice it requires a combination of all the virtues—patience, a quick eye, indomitable persistence and perseverance, powers of endurance, superiority to fatigue, a delicate hand and a light touch, inventive and adaptive power, mechanical skill, the intelligence of a true sportsman and student of Natural History.

The man who combines in himself all, or the most of these, is the man who will most succeed.

Why, what need of artificial culture? says one who has not thought about the matter ; and the question has indeed, often been put to us. Why not let the fish breed naturally and of their own accord in their native streams and ponds?

In reply to this, the best answer we can make is to trace for ourselves the actual circumstances surrounding the natural deposit of ova, in the spawning beds of an open stream.

At the annual recurrence of the spawning period, ranging from November to January, according to the difference in the seasons and rivers, the ripe female strikes up stream for the shallows and clear water, followed by perhaps half a dozen males in procession, the largest first, then the next in size, and so on to the smallest.

The leader scoops out for her a hollow place in the stones or gravel, and there she deposits her ova ; and having relieved herself of her burden she leaves the spot ; the oldest and biggest of her followers drives the others away, and himself goes to the ova bed and deposits his milt upon the newly-laid eggs, thus impregnating them, or, more correctly, *some* of them, and finishes by covering them over with gravel, when, having satisfied the cravings of nature, he too leaves the place.

What happens next ? The disappointed males, of second and third-rate size, come up, and, finding their work done, wreak their vengeance on the unfortunate ova, by sweeping aside their covering of gravel, and eating all the eggs they can find. So much for enemy No. 1.

Owing to the stream, it may be, the milt of the male fish was not evenly distributed over the whole batch of eggs, in consequence of which some, even many of them, were not impregnated at all, and therefore die. Here is difficulty No. 2.

Then comes down a freshet or a flood, and the tiny globules at the bottom of the stream are carried down far away from their first resting place, to fall an easy prey to coarse fish, cannibal trout, beetles, rats, swans, and other water fowl, which dearly like the ova of fish ; and thus it happens that, even under favourable circumstances, not more than 5 per cent. of ova naturally deposited ever come to any good.

Remembering that a female trout has on an average 1,000 eggs for every pound of weight, a few good-sized fish would soon stock miles of river, were it not for these numberless enemies.

What a contrast this is to the case of a fresh batch of ova, taken carefully from the mother trout, artificially impregnated from the selected male parent, tended and watched in the hatching trough, covered safe from accidents of flood, or mud, and the attacks

of all natural and unnatural enemies, and eventually hatching out 50, 60, and 80 per cent. into strong, healthy fish.

It has been stated by some writers on pisciculture that they can ensure hatching 90 per cent.

I can only say I never attained to this, and I very much doubt, even if one did succeed in hatching that proportion, whether there would not be 5 to 10 per cent. of weakly fish, which would succumb within the first ten weeks of their existence.

These flowery writers, who have such enormous percentages of hatchings, do not enlighten us on this after mortality ; and this leads up to a second and most important point to be noted.

The fish should be hatched as strong as possible—fish that will improve in size, strength, and activity visibly day by day, and at the end of three weeks, when the yolk sac is absorbed, will begin to pick up for themselves, and be ready for turning out to get their own living.

It is easy enough to hatch unhealthy, weakly fish—that may be done without any trouble ; those who take little or no trouble about their ova may get the 90 per cent. hatchings, only to find that a large percentage of deformities and mortality awaits them later on—and the reason is, that the cleansing of the eggs and trays daily is a very trying process for the ova. All those imperfectly impregnated die at once ; the weak and feeble that would, if left alone, develop

weak and feeble fish, cannot stand the process of being kept free from an outer covering of sediment from the water, and they die ; the strong ones weather all the vicissitudes of this period, and hatch out strong, healthy fish.

To me, it is less disappointing to have a loss of a certain number of eggs than, after sixty, eighty, or a hundred days of waiting and watching, to find my infant fish dying from sheer weakness.

I am supposing, however, that you are all acquainted with the general elementary outlines of procedure in pisciculture, from reading some of the books that deal voluminously with the subject ; while many will remember that in my remarks before this Society last year I described pretty fully both apparatus and manipulation.

It will be well, perhaps, to recapitulate some of those points here, for the benefit of those to whom the subject is new.

We will start, then, with the period when ripe parent fish are available—wild or tame. I have, myself, bred from the same trout three years in succession, and the only advantage I know belonging to the use of *tame* fish (*i.e.* fish kept in captivity, or in a place where they can be caught with little trouble) is, that they are always to be had when wanted, and are quieter than the wild under the hand. Both of these are great points.

Having taken the parent fish and divided the sexes, discarding those of both that are not perfectly ripe, the ova is gently pressed from the female into a flat dish—gently “coaxed” would be the better word; because, if *pressure* is needed the ova would be useless, and injury to the mother would almost certainly be the result.

As a rule, she is glad enough to be rid of her burden, and when released will swim away vigorously up stream. A male fish is next taken, and by holding him over the pan and using the gentlest pressure his milt is ejected on the eggs, which should be stirred gently with the finger or a feather to assist absorption; and it is a happy sign when the eggs assume an almost transparent appearance, with a beautiful bloom, like a peach.

This process just described being repeated as many times as there are fish to be stripped, then comes the laying down in the hatching trays, which we will suppose are ready, either of wood, zinc, slate, or earthenware.

Wood trays are difficult to keep clean and water-tight; they become slimy if painted, and if wood is chosen the best thing to be done is to char the inside of the surface.

Zinc trays are very clean; but besides the fact that in some waters the metal oxidises quickly, and in a very short time is riddled with holes, one great draw-

back exists with them, which is that any alteration as to outlet or fencing the trays means the use of the soldering iron.

Slate troughs are beautifully clean, and there is little to be said against them, except their cost ; and *Earthenware* has one advantage that slate has not, it is porous, and thus allows a certain amount, and a sufficient amount of water *under* the egg, lying on the bottom of the trough.

The bulk of the ova is spread over the surface of the bottom of the troughs, so that they may be pretty equally distributed, touching each other ; but it is better they should not lie one on another.

Some culturists cover the bottom of their trays with gravel, previously boiled to destroy life germs, and if we use wood, zinc, or slate troughs, it is to some extent necessary. I once, however, heard a fish culturist say, "Shun gravel as you would the pest," and my experience goes far to justify the cry.

I hate gravel, and never use it now. Why ? Because the eggs have a curious—I had almost said instinctive—habit of hiding themselves under the gravel. There you cannot see them, or suspect mischief from them. The dreaded byssus, the most destructive and fatal disease, gets hold of the hidden egg, and before you have discovered the cause concealed under the pretty gravel one half of your tray of eggs is sacrificed,

dead, killed by the epidemic arising from the one hidden germ of the disease.

So, too, when the young fish are hatched they seek hiding and seclusion in the interstices of the stones and gravel, and the effort to clear your tray of newly hatched fish will result in a dozen or so crushed to death at each operation.

Beyond and above both, there is this : You cannot keep gravel clean ; the sediment from the water, however pure ; unfiltered, will settle in and on the gravel, and in itself be a source of evil to the ova.

After trying wood and zinc I now use earthenware troughs, clumsy to look at, heavy to move, but the best of all materials wherein to hatch and grow the Salmonidæ.

The troughs should be arranged one above the other, so that a constant stream of pure water may flow in at one end of the top one, or No. 1 ; out at the other end into No. 2 ; along that trough, and into No. 3 ; and so on, giving a uniform depth of water in the troughs of about three to three-and-a-half inches ; and there at the bottom of this three inches of water the ova remain, to be looked at, tended, and cleaned daily, till at the end of sixty or seventy days the moment of hatching arrives.

What is there to do during this time of quiet for the eggs ?

Every day the dead eggs must be picked out. They

are easily detected, and a dead egg left unremoved for twenty-four hours will communicate disease to all the eggs round it, and they in turn spread it through the whole length and breadth of the tray, so that carelessness in this one particular will result in a loss of some 20,000 eggs in forty-eight hours.

The daily flow of the shallow stream of water over the ova will result in a very fine deposit of sediment or dust upon them, easily to be seen every morning on taking off the covers of the troughs.

The theorists say, you must not disturb or move the eggs ; after the first twelve or twenty-four hours such movement is fatal. Well, this is theory, and those who stick to this will find at the end of sixty days that their batch of trout ova is brown, opaque, muddy, instead of brilliant, transparent, with a mauve or pinky bloom.

They will hatch their fish half asphyxiated and weakly, because they have been smothered with mud and dirt, and they *may* rear one half of those so hatched.

On the other hand, my own practical experience has demonstrated this fact, that the eggs may, and should be, brushed over daily with a feather or camel's-hair brush, or washed and rolled about with an extra flow of water, with this result, that a certain proportion, lessening with every such operation, die after it, but the remainder hatch out strong, healthy,

vigorous fish, able to take care of themselves within five hours of their birth. These daily cleansings should be performed with the utmost gentleness, patience, and care, and when thus undertaken and carried out, will be perfectly successful. It is not difficult to determine which is the best result.

A very natural question may be asked—What quantity of water is required to be constantly flowing over the egg troughs ?

The answer is—circumstances must decide how much ; in practice it is easy to find out the proper quantity and regulate it, but roughly it may be laid down it should not be permanently, less than will flow through a half inch, nor more than the capacity of a one inch pipe. Too little starves the eggs, too much stirs them up and disturbs them.

My own experience will help to give an idea. Two years ago I had some troughs fixed in a building away from the river, and close to my house, where well-water had to be pumped for the supply. Owing to this fact I was very sparing of the water that cost so much labour, and I have no doubt a very large proportion of the mortality in those troughs was to be traced to the stinted supply of water.

In a new house I erected last year I corrected this fault, and instead of running through my hatching troughs 800 gallons of water every twenty-four hours, as in the first instance, all last season the stream was

going over them at the rate of 14,000 gallons in the same period, with a further power of being able to run fifteen gallons a minute instead of ten during cleaning-up time.

"Once the fish are hatched out, your troubles are over," on one occasion said a friend. We shall see.

The temperature of the water decides the length of time required to hatch out. Many recommend a very low temperature; and to keep it down to 38° would use ice, plentifully, on the other hand anything ranging between 45° and 50° may safely be said to yield the best results, and with this about sixty days are required; warmer water, less time, weaker fish; colder water, longer time, stronger fish.

At any rate, we will imagine the fish are hatching—and queer, nondescript creatures enough they look, a head and a tail, and a little irregular shaped yellow bag suspended between. This little transparent bag is an important item—it is the yolk sac, Nature's provision of food for the newly-born trout for the first three weeks of its existence, and a very beautiful object is this tiny creature, which at this stage is called an "*alevin*." By holding it in a tube of water against the light may be seen the heart pulsating, the vessels circulating the blood with ebb and flow all through its frail body, the rudimentary flaps, which will by and by develop into gills, throbbing excitedly

with the newly-given life ; and every now and again a vigorous, active rush for the nearest shelter gives earnest of what a game fight the little fellow will make, if he is spared, to scale in future years anything from 2 to 4 lbs.

As the days go by, the yolk sac is seen to be growing gradually less, and the alevin more and more like a fish in its general outline ; and it is at this period, that while they are no trouble in themselves as to disease or feeding, for this is the healthiest period of the trout's life, great care is required to prevent casualties.

It is to be noted (and *one accident* will prevent it ever being forgotten) that an accident in fish breeding is sure to be a big one.

Hence the necessity, indicated at the commencement of this paper, for inventive, adaptive, and mechanical skill.

Newly hatched alevins will congregate by thousands at the two ends of the troughs—the strongest will seek the upper end, the weaker ones the lower ; and there, with heads all turned together one way, almost after the fashion of a London crowd, some 10,000 or more fish will form a black, solid looking mass, sometimes as large as one's double fist. Now, let the water be turned on too fast, the lower lot will inevitably be washed against the wire guards and screens at the end of the trough, and either strangled through the

perforations or choked by the rush of water too strong for their tiny gills.

On the other hand, let one of the gratings be lifted but a hair's breadth out of place, and the culturist will soon have costly evidence as to how small a space the troutlings will get through, in the loss of hundreds that escape up the stream or die in the attempt.

Again, from the hatching moment there is constant anxiety lest anything—carelessness, malice, or accident, should ever stop the supply of a running stream.

Two instances occur to me. Last year, in the midst of cleaning operations, and when the supply of water was turned nearly off from one of my troughs, I was called away, and, thinking my absence would be minutes, I carelessly omitted to do what in any case ought to have been done, so little trouble was it—turn on the supply of water.

I was away an hour, and on my return the whole of the fish in that set of trays were either dead or dying ; and though with great trouble and much labour I was able to resuscitate some few hundreds, I lost the bulk, some 8,000 to 10,000 fine healthy fry, through the simple omission to turn a tap, on breaking off the work I had been about.

Malice is even worse than carelessness or accident.

A neighbour of mine, in Kent, left his fish house all right in the evening. Some evil-disposed person,

in the night, turned off the supply tap to one set of troughs, and next morning some 60,000 fish were lying dead.

It is not exaggeration then, to say that a casualty in fish rearing is a big thing, and requires promptitude and immediate action to prevent a speedy loss, perhaps, of hundreds of pounds.

Little is known of the diseases to which the young fry are subject; the diagnosis is difficult, and for myself, the experiments I have indulged in, were distinctly with the object of saving as many as possible, of the affected, by such ready remedies as I could invent at the moment.

The deformities came in for first attention, because observable from the moment of birth. It may be laid down at once no alleviation is possible here:—Two-headed fish, curvature of the spine, broken spine, a spiral vertebræ, and other deformities—they may and will, all go on fairly well, till the yolk sac is absorbed, and then they must die. Better, therefore, to clear them out at once. In this particular, however, last year, I made certain memoranda with regard to the number of deformities amongst the different species of the Salmonidæ, and I found that the greatest number were among the *Fontinalis*, and the least among the sea trout or *Salmo-Trutta*.

It has been said by one or two practical men that the deformities, as well as the weakly, sickly fry, are the

direct consequences of allowing the dust, or sediment to settle on the ova, and so excluding a complete and healthy circulation of proper aerated oxygenised water.

I shall not enter upon those diseases arising from fungus, or easily preventible causes, such as strangulation, cannibalism from overcrowding, gill fever ; these are well known.

There is, however, one which is very common, and which, for want of a better name, I have called the "dropsy," from the appearance that the affected fish presents—a sort of water-bag encircling its body, and extending itself till nearly the whole fish is included.

Inside the outer membrane, of a delicate mauve in colour, may be noted all the organs of life pulsating in the yolk sac ; but if left to nature one result only must be looked for. One morning the owner will find his patient lying prone on the floor of the tray, dead.

Experiments have given me one safe remedy—the operation of puncturing the water sac—which saves about sixty per cent of the fish so attacked. Briefly, the plan is to set aside one tray as a hospital, or infirmary, and there, daily, affected fish are removed from the general troughs.

As soon as the water sac has become fully developed, the patient is lifted out with a tube and laid upon a soft towel in a single globule of water : deftly with the point of a fine needle the outer sac is punctured,

without injuring the inner yolk sac, and in less time than it takes to relate, the fish is replaced in a portion of the infirmary fenced in for convalescents. Sixty per cent, of those so treated recover.

Oddly, enough since these operations were made before the Gresham Society, I have come across a notice of this disease in a work by Livingstone Stone, the well-known American pisciculturist, and his notes are worth reproducing. He calls the disease "Seth Green's dropsy, or blue swelling of the yolk sac," and he remarks further—"This is a very noticeable disorder among the alevin trout, and being an affection of the yolk sac, is of course confined to them.

"The sac becomes swollen to three times its usual size. The outer membrane shows very thin and transparent, is seen to be filled with a bluish liquid, and when punctured, discharges a thin watery fluid. Seth Green's book calls it the dropsy: it affects only a few fish, and is not contagious. I know of no special cause, and *no remedy*. Green says the fish can sometimes be saved by tapping the sac and letting out the dropsical matter; but I doubt it, and think the disease is always fatal."

This is the theory of pisciculturists. I never saw Seth Green's book, and only read Stone's since this paper was written, therefore my conclusions have been arrived at independently and by another method than theirs, namely, practical experience.

I found the same disease, I gave it the same name, "Dropsy," and I experimented, with the result that I saved 60 per cent by the very remedy, which the theorist doubts, but which if he had put in practice he would have believed in.

One note worth making is, that whatever disease the alevins may be suffering from, an occasional dose of salt may do them much good, and can do no harm.

At the age of four weeks up to ten or twelve, the healthy fish may be turned out into nurseries and small streams to get their own living ; and it is a great enjoyment to the fish farmer, some few months after he has let loose his little brood, to find, darting hither and thither among the stones of the brook, lively, active troutlings, of three to four inches long.

How fast do trout grow ? is often asked. To what size do they attain the first year ? The rate of growth differs in the different species, and under varying conditions of food supply and water, quantity and quality. Four to six inches is a fair average for yearling brook trout. The fastest grower I ever had or saw, is a salmon trout, now in my nursery ; hatched in March last and now, in September, eight inches long, at six months old, a wonderful growth, and a very healthy fish.

Time fails to treat in this paper, of the further feeding and rearing of the fish to the yearling age, but one experiment made last year deserves record before

closing these remarks, as shewing the effect of river pollution upon young fish.

In all the operations carried on by me I have used spring water, conducted from natural springs unconnected with the river, which has for two or three years past been more or less polluted by paper-mill refuse, to the injury and destruction of all kinds of fish, especially of the trout, which were formerly plentiful and of good size ; but last year, in my new hatching house, I laid down a special trough and fed it with a stream of water from the River Darent through a syphon tube.

In this tray, on March 24, I placed thirty-six healthy, strong fish some weeks old, *Salmo Fontinalis*. At nine next morning they were dead. I cleansed the tray, and started it again with twenty-seven Loch Leven trout ; at nine next morning they had all succumbed, and were lying dead.

I then placed thirty-three *Salmo Trutta*, sea trout, in the tray, and as it happened to be Sunday, when as I suppose, fresh supplies of poison were not being turned into the river, they lived until the Monday evening, a period of thirty-six hours.

The batches from which these experimental fish were taken continued to live and thrive, it is needless to say, in the spring water which forms my constant supply.

These few observations will be seen to be purely

practical, and from my own personal experience. I offer no theories untested, and in every operation, from the beginning to the end, even in failure as well as success, I have set before myself the one aim, as closely as possible to "*imitate Nature.*"

That is the great secret, I believe, and the inevitable monotony of certain periods in the process, is relieved by the excitement inseparable from others, as when one's powers of endurance are taxed by a day, or two, or even three days in succession in the middle of December spent, wading for hours in a river above one's knees and handling some hundreds of parent fish, stripping the ova, and then securing its safe journey to the hatching troughs at home. This is only equalled by the lively satisfaction that comes, when, on a bright spring morning, one can stand by one's hatching trays and see the young fish literally jumping into life in thousands.

I think I have demonstrated the need I propounded at the first, of a quick eye, perseverance and endurance, mechanical skill and patience, and, above all, a love and an increasing knowledge of nature and natural history.

The man who has all these need not fear to make a beginning in fish culture ; he may fail once, he will certainly experience disappointments, but in the end he will have success.

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THE
SCIENCE OF BARBEL FISHING.

A PAPER

READ BEFORE

The Gresham Angling Society,

BY

H. JERVIS ALFRED,

Hon. Curator, T.G.A.S., Gold Medallist 1880-81, Special Prize Medallist 1882,

ON TUESDAY, 3RD OCTOBER, 1882,

J. P. WHEELDON, ESQ., IN THE CHAIR.

LONDON :

^{with.}
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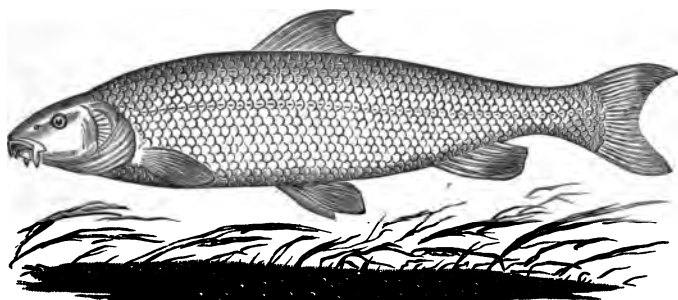
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3RD OCTOBER, 1882.

J. P. WHEELDON, ESQ., in the Chair.



THE BARBEL.

Le Barbeau. Die Barbe. Cyprinus Barbatus.

MR. CHAIRMAN AND GENTLEMEN,

When our Secretary asked me some time since if I would read a paper to the Society and start our Winter Session, I hardly expected that I should have the honour of reading the first paper in the new room ; and still less when the science of barbel fishing was suggested to me as a suitable subject, did I imagine that we should have as chairman on the occasion a

gentleman so well known to the angling world, not only as a first-class all-round angler, but as one who has made a special feature in particular of the fish which is the subject of the present paper.

The barbel is a very widely distributed fish, thriving especially in certain situations ; early in the season the rough waters of the weirs being frequently their most favourite haunt, whilst later on, heavier streams are nearly always their chosen resort, their round and compact body, pointed head, and large fins being especially adapted to these heavy and rapid waters. In some parts of the Thames their numbers appear to have somewhat decreased, owing to the great quantities taken from the water and kept for the purpose of weighing-in at gross weight competitions.

Barbel are found in many of the Continental rivers—in the Danube especially they grow to a very large size. In a report last year from the diamond fields of South Africa was a notice of a brace of barbel weighing respectively forty and thirty-five lbs., caught by the manager of one of the diamond companies in a neighbouring river ; the length of the larger fish was five feet. Cuvier says that in localities favourable to their growth they will attain the length of ten feet, but I do not think he mentions the weight of these leviathans, or even where they can be actually caught.

As an edible fish, except by our Hebrew friends, barbel is not held in very high repute, though our Gallic neighbours, who are some authorities in such matters, are of quite a different opinion—in all cases, however, carefully avoiding the roe, which appears to be of a semi-poisonous nature. Giving you my own particular experiences, I may say that from some I caught in the Thames I had a brace boiled the same evening ; they were decidedly muddy. Four of the others were gutted and rubbed inside with salt, then placed side by side on their bellies to drain for a day and a half—then, after being washed in salt and water, and perfectly dried, they were fried with egg and biscuit powder in fillets, and they were excellent.

At Tours and other Continental riverside towns “Les Trois Barbeaux” is a well-known sign, and the inns generally keep an abundant supply of live barbel and other fish in fish trunks in the river, ready for use on festal occasions. A sort of historical interest attaches to this fish, owing to its being found on one of the four heraldic quarterings of Margaret of Anjou, wife of Henry VI., and we find that in the time of Elizabeth they were amongst the fish protected by statute law, no one being allowed to take barbel of less than twelve inches in length.

They are occasionally taken in the Thames weighing

from 12 to 14 lbs., but these monsters are now very rare. A barbel weighing nearly 14 lbs. was caught by Mr. Hughes at Sunbury Weir in May, 1880, when spinning for trout with a *Bell's Life* spinner, but being close time he returned it uninjured to the river. Salter says that he knew of one that was caught at Shepperton, which weighed 19 lbs. 10 oz. ; also of another taken at Sewardstone Mill in the Lea, weighing 18 lbs.

With regard to Thames barbellling in the present day, I should think the stock of fish would soon be quite as good as in years gone by if anglers would be more careful to return undersized fish. Of course thirty years ago there certainly were not so many anglers, and angling clubs could almost be counted up on your fingers, whilst now the number of London clubs is 160, and until they all taboo the very absurd custom of giving prizes for big takes instead of for specimen fish, so long will there be complaints from the generality of anglers of the apparent decadence of Thames barbellling, because the small stock fish are kept for weighing in instead of being returned to the water. As I have before observed in this room, the clubs hold in their hands a vast power for good, if they only exercise it in a proper manner, and they have the duty to perform of educating their members to a proper standard by

raising their scale of takeable fish and thus leaving no excuse for the retention by their members of fish which ought to be put back for stock.

Then again, look at the damage and annoyance caused by that abomination of anglers, the steam launch, washing away and undermining the banks and causing so many deathtraps on the banks of old Father Thames. There is hardly a barbel pitch on the Thames where you will be exempt from annoyance from a succession of members of the snobocracy out for the day, who unfortunately appear to be, in a large majority of cases, the temporary owners of a "Puffing Billy." Of course there are many launch-owners on the Thames who are really gentlemen, who treat anglers, whether in punts or on the bank, as they would like to be treated if they were in a similar position. These invariably slacken speed and will pass a punt without causing any annoyance, and against these no complaint can be urged. It is to be wished that the same could be said of the others; but their idea appears to be, that having paid a certain sum for the day's outing, the proper thing is to have the largest amount of personal enjoyment for the money, without regard to anyone else. Once upon a time it was possible to secure a barbel pitch, and after well baiting it for an evening or two previously, then to drop the punt quietly down

and fish it steadily without having to move the poles until a barge came within sight. It was then easy enough to draw the poles in good time and move out of the way, returning again to the swim after receiving a greeting of "What sport?" from the bargee. The swim was little disturbed by the passing barge, and a few worms occasionally thrown in sufficed to keep the fish together.

The only other special annoyance of those days would be from the erratic movements of an occasional skiff, which, in default of keeping a straight course, would meander about and disturb every part of the water. The rowers would be generally clad in flannel garments, made like unto Joseph's coat of many colours ; who rarely pulled together, or attempted to keep time, but whose oars, when viewed from the distance, appeared to convert the skiff into a floating windmill. Right well have these gentry been described by our friend Wheeldon, who saw some fine specimens of the variety when fishing with me for trout at Sunbury, one day last year. He said, the following week, in *Bell's Life*: "Perhaps one of the most marvellous effects of the brilliant weather is the everyday display of some hundreds of lunatics, who, because they just know the blade of an oar from the handle, affect childishly ridiculous and unmanly costumes. It is nothing now to see so-called 'oars-

men' dressed like circus clowns. Others affect a kind of bastard garb, making it difficult, save to the most practised eye, to distinguish the sex of the absurd persons 'toiling at the oar.' What a pity it does seem that a splendid muscular exercise, and an art—a real art—that has held its own at all times, should be disgraced, prostituted, and rendered ridiculous by a multitude of donkeys whose mission would seem to be better fulfilled were they usefully occupied in eternally measuring yards of tape. We have little heart and less patience to dwell upon the wretched specimens of English oarsmen one sees now-a-days. They to whom we refer come of a class that always were and always will be fools to the end of their tether. The main wonder is, that well-dressed and apparently ladylike women can consent to consort with such companions, even for a time, from amongst a type of human beings only a little less pitifully contemptible than a troop of half-starved baboons, tricked out in a lot of feathers and spangles, dancing to the sound of a barrel organ at a country fair." Very curious that it should be so, but when these peculiar males and females are in the same boat, however they may ape the "correct article," still they are not "in the same swim" at all. Indeed, whilst barbellling this year, I have noticed that those very boats which had the advantage of a female coxswain were in general the very boats to steer into or across your swim.

Let us, however, now leave these disagreeables, which I suppose will always be inseparable from all amusements and sports till we arrive at a more enlightened period of the world's history, and now that we have spoken somewhat of a few of the causes which militate against good takes of fish, let us consider, though of necessity rather briefly, certain features of the science of barbel fishing, to which, I think, if more attention was devoted, there would often be a much better chance of the angler making a good catch.

There can be no doubt but that by far the large majority of anglers use tackle very much coarser than is at all requisite ; and if this holds true of angling for trout and pike, how much more apparent is it when fishing for barbel. I am quite aware that some of my hearers will say, " Oh ! this is very true, but I always fish fine." " Quite so ;" and that is how you have been able to record good takes where others have failed, and it is to this latter class that I am now more especially addressing my observations. I learnt this lesson of fishing fine more than thirty years since ; and if I could then, with my very imperfect experience, manage to land twenty-six barbel in the afternoon, on fine tackle with a very slight cane rod which some would consider only strong enough for roach, what cannot be done with

similar tackle by an angler of more experience? The lesson was the more forcibly impressed on my mind owing to my being accompanied by a gentleman who was an old and, as he considered himself, very experienced barbel fisher, who came down for a day's barrelling; and as the puntman with whom he always fished was engaged to me for a week, I invited him to go out with me, hoping thereby to pick up a wrinkle from such a past master in the art. The result, however, was that I landed twenty-six barbel as against a blank on the part of my friend, which could only be accounted for by the great difference in the substance of our tackle. The fact is, that although a barbel is a most powerful fish, and one that will afford plenty of sport if hooked in a sharp stream, still, when the hook is well fixed in his leathery lip there is very little chance of his coming unhooked.

With ordinary care the largest fish may be landed with a running line not much thicker than a hair; be careful, however, not to lose a fish if you can possibly avoid it, for though they are not quite so bad in this respect as perch, still, if you should unfortunately lose a barbel, it is sure to make the others for a time shy, and you will probably find that the shoal will drop lower down, avoiding too close proximity to such dangerous quarters, till a fine juicy lob, attached to an almost imperceptible line, drifting down

with a peculiarly seductive sort of squirmy wriggle, tempts the appetite of some individual of an inquiring turn of mind, who suddenly, and to the great surprise of "his sisters, his cousins, and his aunts," goes aloft to the upper regions and never comes back any more.

Now, with regard to the manner in which a swim is baited, there have at various times been propounded different expedients for causing the ground-bait to arrive at that part of the bottom of the river to which it is wished to concentrate the fish. The old Thames style of pitching in an enormous ball of clay containing a lot of lobs is somewhat objectionable, except in certain places where you can hardly manage to bait in any other method; such as the eddy at the side of a weir, or similar place, where there is usually a strong stream. By using the clay-ball the worms work out gradually, and thus each batch of bait lasts longer than without the clay. The Nottingham style of throwing out a quantity of chopped worms at the upper part of the swim, though proper enough in a sluggish river, had the disadvantage in a strong stream of scattering the ground bait over too much space. I therefore think that the baiting-pot, as improved by our friend Wheeldon, will be found the best thing yet invented for baiting a swim.

To those of you who do not know this useful

adjunct to the barbel fisher's equipment, I would say that it is in the form of an inverted sugar-loaf, the pointed end, which then forms the bottom of the pot, having a strong ring soldered to it. The lid is slightly tapered so as to fit loosely the large end or top, and is secured from parting company with the pot by a chain soldered inside. It has also some three or four large holes made in it so as to admit the water when the pot is tilted on one side. When in use the worms are filled in till they reach within an inch or two of the top, and should be just of sufficient weight to balance the pot when floated down the river, allowing it to rise an inch or so above the water, the lid keeping the worms in till the proper time for their dispersion. A line is fastened to the ring at the lower point of the pot, and when it has floated down a sufficient distance from the punt, a drag on the line will cause the pot to tilt on one side, and the water running in through the holes in the lid it will at once sink to the bottom. A slight jerk will be quite enough to displace the lid and disperse the worms, when the pot can be quietly drawn back to the punt and the operation repeated as often as necessary. It is obvious that by these means the worms are not wasted over a large space of ground, but are more useful in concentrating the fish and keeping them more in the proper line.

With regard to the different styles of barbel fishing

I am not one to pin my faith on one particular mode as against every other, because it will be clear to the observant angler that what is correct in one water may be useless in another. If you are fishing a swim with a tolerably clear level bottom then the "travelling float" will be the most useful, and although you may at first pick up a few fish close to the punt when you commence operations, you will find as the day goes on that if you have tolerable sport the fish will become more and more shy, and will drop down stream lower and lower till at last you will probably find that you are hooking your fish some thirty or forty yards away from the punt, as I did in 1856, when I introduced the use of the "traveller" to the Thames at Marlow. In a day and a half I and a friend landed very nearly three hundred weight of barbel, perch, and dace, and though last, not least, a fine trout of five pounds. Three of the barbel were over nine pounds each; many of the smaller ones we returned to their native element, none the worse for their trip to the higher regions. Since that time I have used it in other parts of the Thames where the water has averaged twenty feet in depth; I could fish this very comfortably with a twelve feet rod, by using the "traveller," which would not have been the case with a fixed float.

In a swim of the description mentioned, I think a

leger will not meet with anything like the success that will attend the use of the float. But in an eddy by the side of a weir, where occasionally very heavy fish are to be found, a leger will be about the only sort of tackle that can be worked with safety, owing to the loose stones and the generally uneven character of the bottom. It is in these sort of places that the heavy fish are taken with the spinning bait early in the season. I have been fishing a run at the side of a weir where I have spotted one of the good old-fashioned sort of Thames trout, and after working it carefully, been rewarded with a tremendous dash from the side of the run, followed up by a sharp fight for, say, a quarter of an hour or so, and after making up our minds that we were at last into one of the right sort, have been disappointed by seeing the great brown back and forked tail of a big barbel, which, like Mr. Hughes's monster, taken under similar circumstances, has had to be turned in to give sport again later in the season.

Then, again, with regard to legering, how very many stick to the old-fashioned style—a coarse leger and winch line with a short stiff rod. Sitting with this held almost at right angles to the line, they wait for a bite, which must be of a very pronounced description for them to feel it, but when they do feel it, what a strike they give in return ! Instead of this, try the artistic style of fine tackle and a light rod ;

hold this so as just to feel the lead, and pointed somewhat down stream. By keeping the finger on the line you will be sensible of the finest nibble. Do not, however, as a rule, strike at this, but give him an inch or so of line by moving the rod gently, or if you are using a Nottingham winch, allow an inch or two of line to run, so as to cause the bait to move down the stream a little, which will generally have the effect of inducing a bolder bite, if they are not much in a feeding humour; then at the second nibble strike, but not too hard. I was fishing, a short time since, a very difficult place close to a boathouse, where it was necessary that the lead should sink close to the timbers, as the bait had to lie about a yard or so away from them. Now, with the ordinary leger and bullet this would form a sharp right-angle, and a fine bite would not be felt, owing to the bullet stopping it; so, to counteract this, I made a leger with the lead hanging just above the swivel. By this means I felt the slightest touch, and when the idea is completed I am sure it will supersede the old leger.

In some parts of the Thames the barbel seem to have forsaken their old haunts and moved to more secure quarters. In one part especially, between Cookham and Marlow, there is, in a deep quiet corner between two streams, a large sunken tree, washed down by the floods, and in the branches of this, deep

down in the water, may be seen at times a shoal of big fish. They seem to know instinctively that they are perfectly safe there—it is out of the track of the disturbing traffic, where even the steam launches cease from troubling and the weary barbel finds a rest. Whilst as for a hook and line, if Job had only had a big barbel on, in such a delightful spot, he would have found himself up a tree in more ways than one, and I doubt if even his patience would have been proof against such a ramification of branches.

I am much inclined, therefore, to think that many of our old barbel swims laying in the direct channel of the river are played out, owing to the work of the launches ; but as many of the puntmen of the present day are either very conservative in their ideas or, what is more probable still, quite unable to spot the fresh habitation of the fish, I think, until the “educated” angler becomes aware that with many of these men he is quite as likely to find out a new barbel pitch as they are, so long will they be content to work in the old grooves, and take their customers to the same old spots, regardless of the fact that the fish have emigrated to “fresh fields and pastures new.” Did not our friend Wheeldon have a wonderful take one day last season from a corner where no one expected such a thing to happen? Unless you are out with a man of the type of Harry Wilder, or Andrews of Maidenhead, Hone

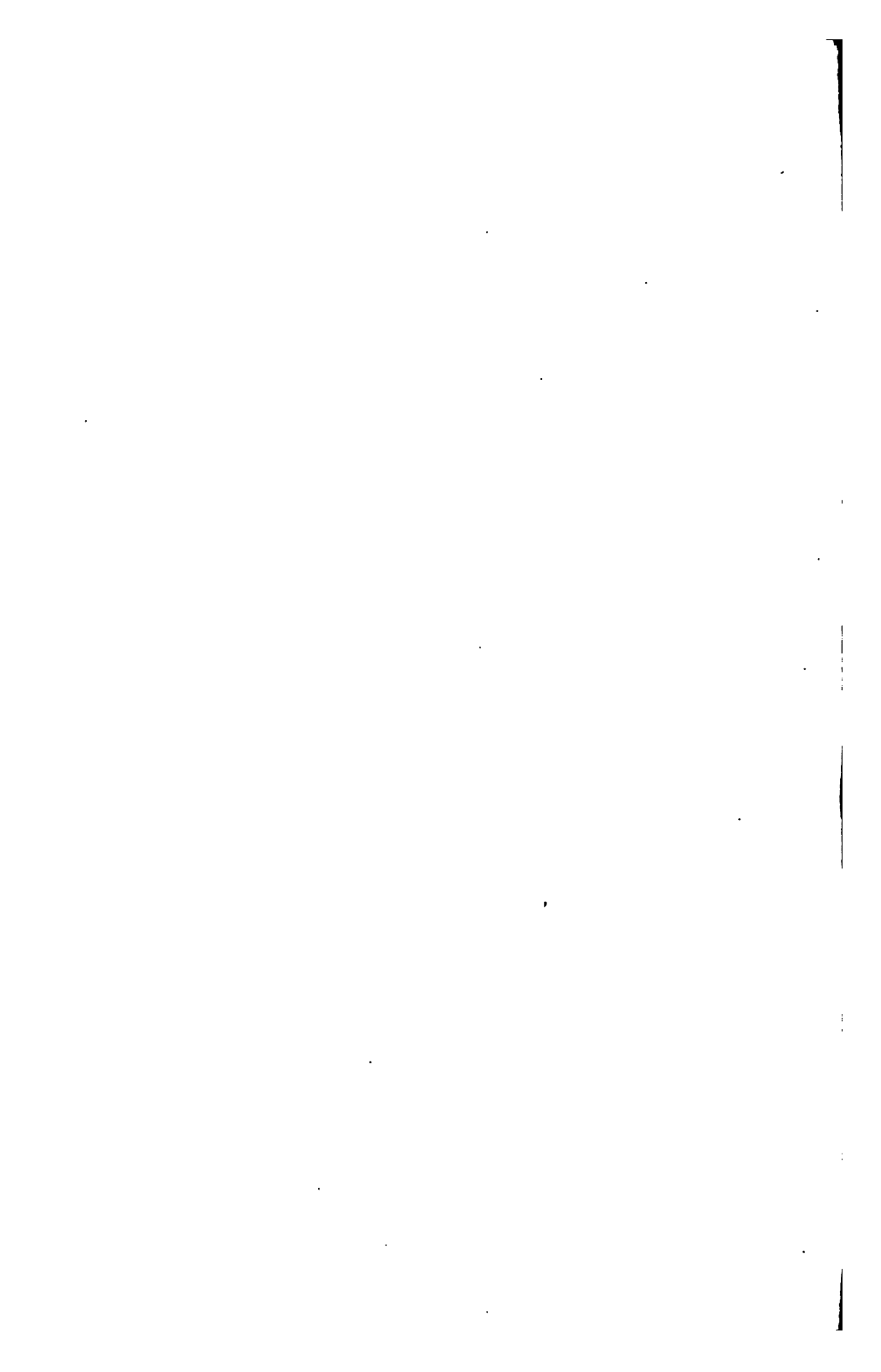
of Walton, Tom Wheeler of Moulsey, or a few others I might mention, it is just as well to take stock of the water yourself; and if you are not quite satisfied with the swim selected, use your own judgment and try elsewhere. As a matter of course this means "baiting" if you are to do any good, but as a general rule, unless you know that you can depend upon your puntman to do what he *says* he does, and unless you can be certain that your pitch is actually baited, you had better sacrifice an evening or two and do it yourself if you wish to have anything like success. With regard to the quantity of worms, I was rather amused with the remarks on this subject in the work of a great angling luminary, that in ground baiting twenty-four hours previously to a day's barrelling, one quart of worms would be amply sufficient. What would he have said to a couple of thousand or more, besides a similar quantity for use during the day? Start a "potful" down the swim when you begin, and as long as they keep on the feed do not give them any more till they begin to drop off, when another potful judiciously sunk will probably liven up their appetites, and bring them on the feed again.

There is one bait that I have not mentioned, and that is greaves; of this, the whitest portions should be selected for the hook, and form occasionally a very

taking bait, but, being of a greasy nature, if much of it is used for ground-baiting the effect is extremely likely to be quite the opposite to that desired by the angler.

There is no doubt but that there are immense quantities of small fry in the Thames, not only of roach, dace, and other white fish, but also of barbel. At Sunbury last year, when fishing with one of the Strouds, he took a canful as large as minnows with a casting net when throwing for bait for my paternoster ; we returned them safe to the river ; it showed however, that there were plenty of fry coming on to keep up the stock, and if these youngsters keep increasing in wisdom as their own immediate parents have increased on that of their ancestors, it will eventually require the wisdom of a Solomon to circumvent the cunning of a Thames barbel.





AN ANGLER'S PARLIAMENT.

A P A P E R

READ AT A MEETING OF

The Gresham Angling Society,

BY

A. W. PARKER,

NOVEMBER 7TH, 1882.

EDWIN FROST, ESQ., IN THE CHAIR.

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INTRODUCTION.

In this Paper is advocated the assembling in London of a United Council of Anglers, composed of delegates from the whole of Great Britain and Ireland.

The various attempts which have from time to time been made to amalgamate the three separate and distinct Central Associations or Parliaments which anglers now possess, and unite them under the direction of one Chairman and one Secretary, have hitherto failed. Naturally the present officials of the existing societies may not care to resign the positions which they have held for so many years past; but if this point could be overcome, the additional work which would necessarily be thrown on the new Secretary would be more than he could accomplish, even if his whole time was devoted to the Society, provided its operations are to be partially as comprehensive as those of the Parliament suggested in the following pages, in which a remedy will be found for these difficulties.

On the 20th December, 1882, "The National Fish Culture Association of Great Britain and Ireland" was established, and this Society should have strong claims to be represented in An Angler's Parliament.

AN ANGLER'S PARLIAMENT.

By A. W. PARKER.

PAPER READ BEFORE THE GRESHAM ANGLING SOCIETY, ON TUESDAY,
7TH NOVEMBER, 1882.

EDWIN PROST, ESQ., *in the Chair.*

MR. CHAIRMAN AND GENTLEMEN,

My object in writing this paper is simply to draw the attention of my brother anglers to what *I* consider, firstly, the most effectual method of increasing the supply of fish in our public waters ; and secondly, to the steps I think necessary to secure our just rights to fish therein.

In order to accomplish so desirable an end I maintain that the whole of our public waters should be placed under the control of some competent authority having the interests of anglers at heart. Now, I trust you will agree with me that no one could perform these duties better than anglers themselves. I therefore call upon the angling fraternity of the United Kingdom to unite and claim its undoubted right to self government by representatives of its own choice in all matters piscatorial, subject only to the vested interests of riparian owners and their tenants.

The British Government, as a rule, undertakes

only the laws applicable to the general community : local interests and government of cities and boroughs are entrusted to Municipal Councils, unincorporated towns and districts to Local Government Boards, and parishes to Guardians. Some of the more important interests affecting portions of the general community are placed under special departments of the Imperial Government, as, for instance, the Board of Trade, a sub-department of which is devoted to oyster and mussel fisheries. But salmon are under the care of Local Conservancy Boards, superintended by the Home Office, having a grant of £2,430 per annum. The two Inspectors of Fisheries—Spencer Walpole, Esq., and Professor Thomas Henry Huxley—have each £700 per annum. Surely this annual Government grant might be increased, and a portion devoted to trout and coarse fish culture.

On the 19th June last the House of Commons was justly described by its Speaker as the oldest and strongest national assembly in the world, and that it reflected the English people. Now, that is just what we require—a Council that will truly represent us ; therefore I cannot recommend our adoption of the present constitution of the Salmon Conservancy Boards, as in my opinion it savours too much of the Upper House ; neither do I entirely agree with that of the Board of Guardians, as it appears to err in the opposite direction. Let me then refer you to the

method by which the people of England secured their claim to a voice in the Government through representatives of their own choice, having the power to vote supplies and control their expenditure. But as it took more than one thousand years to establish these great rights, we cannot hope to accomplish our purpose until by a united effort we are able to force our claims on the nation at large.

Our ancestors mainly secured their rights by means of guilds or trade parliaments, originally composed of members following the same calling or profession. The word guild is taken from the old Saxon word *gildan*, to pay or contribute. Its origin was the Saxon system of frank-pledge, or *frith-gild*, which required every freeman of fourteen years of age and upwards to find sureties for his good behaviour. Every ten families were required to contribute and become bound to each other to produce *him* who committed an offence, or to make satisfaction to the injured party. For this purpose they raised a sum of money amongst themselves, and put it into a common fund. But in order that they might be able to identify each other, as well as to ascertain if any one was absent upon unlawful business, they assembled at stated periods at a common table and dined together. This custom, I need hardly remind you, is still kept up by our City guilds. When William of Normandy conquered England he found these Companies

already established in London, Exeter, and other large towns. Our early kings either begged, borrowed, or stole from them, as necessity prompted or opportunity offered. But they (the guilds) in return gradually combined ; having from time to time received numerous charters, ultimately succeeded in obtaining municipal government, and at length were permitted to choose their own Lord Mayor in King John's reign by his fifth charter, dated 9th May, 1215. The influence of these guilds so raised the status of the Commons of England that at last it was found expedient to occasionally summon them to Parliament in order to provide the Government with supplies. This was first done in a constitutional manner in Edward the First's reign, on the 30th September, 1283. In 1307 Parliament became a legislative power, since which it has been necessary to obtain its consent to constitute any law. We thus see how the members of voluntary guilds gradually obtained the government of their city, and ultimately a voice in the Parliament of England. The British nation was formerly divided into three kingdoms, each having its own parliament. The present Corporation of London is composed of what anciently formed three municipal councils, viz., those of the City, Westminster, and the Borough. It is a somewhat remarkable coincidence that we anglers now possess three central Associations or parliaments. This year the first

successful step was taken to consolidate these councils by the formation of the United London Angling Fisheries Society.

I now propose to give you some information with respect to the authorities with which London anglers have most to do. The Thames Conservancy was, from time immemorial, vested in the Lord Mayor of London ; its first charter was granted by Richard I., and dated 14th July, 1197 ; the right was extended by Henry VI. on 26th October, 1444, and confirmed on 20th August, 1604, by James I. In 1624 the Thames was made navigable to Oxford ; in 1636 the ballast was monopolised by Charles I. By 20th and 21st Vic., c. 147, Local Act, twelve conservators were appointed on 17th August, 1857, as a compromise between the Crown and the Corporation of the City of London, arising out of conflicting claims to the bed of the river. On the 29th July, 1864, this Act was amended by 27th and 28th Vic., c. 113, and on 6th August, 1866, their powers were extended from Staines to Cricklade in Wilts. In 1867 additional powers were given them between London and Staines. This Board consists of twenty-three members, seven representing the City, viz. :—The Lord Mayor, two Aldermen, and four Common Councilmen. The Admiralty and Board of Trade have each two nominations. The Trinity House is represented by its Deputy Master and one nominee.

There are also six elective representatives, viz., two for owners of shipping registered in London, two for owners of lighters and steam tugs, one for owners of river passenger steamers, and one for dock-owners and wharfingers. The upper navigation is represented by four gentlemen, whose names are, as per City of London Pocket Book, 1881 to 1882 :— Rev. J. C. Clutterbuck, J. K. Hedges, C. H. Witherington, and G. H. Vansittart. The offices are at No. 41, Trinity Square, Tower Hill ; its Secretary is Captain Burstal, R.N. ; Chairman, Sir F. W. E. Nicolson ; Superintendent of the Upper Thames, Captain Etheridge, of Reading.

The Thames Angling Preservation Society protects the river from Richmond to the City Stone at Staines. It was founded on the 17th March, 1838, at a meeting held at the Bell Inn, Hampton, at which the following gentlemen were present, viz. : Henry Perkins of Hanworth Park, C. C. Clarke and Edw. Jesse of Twickenham, Henry Jepson and Richard Kerry of Hampton, W. H. Whitbread of Eaton Square, and David Crole of Strawberry Hill. The committee, consisting of twenty-four members, meet the first Tuesday in each month at 7, Ironmonger Lane, City. The Secretary, Mr. Wm. Henry Brougham, of Swayfield Villa, Hounslow, attends on Tuesdays and Fridays at the city office, between 9 and 11.30 a.m., the Treasurer and Chairman of Committees being

Mr. Thomas Spreckley of 13, Cannon Street, City. The objects of this society are to protect the fisheries of the river, and to increase the native fish, as well as to introduce other fish, by means of pisciculture or otherwise.

River Lea Conservancy. The offices of which are at No. 12, Finsbury Circus, E.C. ; G. Corble, Esq. clerk to the board, which consists of thirteen members having no shares or private interest in it, and are elected every four years. Five represent landowners, viz., Richard Hunt, chairman, J. Barnard, E. Cook, J. Blott, and T. Garratt. Bargeowners have one representative ; the New River Company, two ; the East London Waterworks, two ; the City of London, one ; the heads of the Local Boards of Health of nine districts adjoining the Lea, one ; and the Metropolitan Board of Works, one. The Lord Mayor of London and the landowners appear to have shared the powers of conservators from time immemorial. The earliest Act of Parliament referring to these authorities was passed in the reign of Henry VI., A.D. 1424. By c. 18 of the 13th year of Elizabeth, 1570, the Lord Mayor and Corporation were required to possess and repair both banks of the river, and dig or deepen the cut, and were also to compensate the owners of land for their fish and fishing rights, and also for the land so taken ; the Corporation also received powers to punish offenders. By 7 George III. c. 51, s. 107, it

was "enacted that Lords of Manors may fish, fowl, and have all rights to which they are now legally entitled." This Board was incorporated 1868 by 31 and 32 Vic. c. 154. Its powers commenced April, 1869, and now extend from the river's rise in the County of Bedford to Bow Creek. The preservation of the Lea is under the care of the United London Angler's Central Committee. The Thames and Lea Conservators reserve their rights to the fish in these rivers, but delegate their protection to the societies herein mentioned. Unfortunately these societies have different rules and standards for fish which may be taken; therefore the consolidation of rules should form an early portion of the work of the Parliament I recommend.

The Thames Rights Defence Association, is "an organised society for resisting encroachments on the rights of the public in the river Thames, by riparians or others." The first meeting of this society was held on the 24th November, 1880, at Simpson's Hotel, Strand, at which about fifty gentlemen attended. A committee was then formed consisting of sixteen members, including its secretary, Mr. J. M. R. Francis, of 11, Old Jewry Chambers; Chairman, Mr. Francis Francis, and Treasurer Mr. W. A. Crump, of 10, Philpot Lane, E.C. Meetings are held as required. This society is supported by voluntary contributions, and all its members are honorary.

I now propose giving you the origin of our three central associations.

In 1872, Mr. R. Ghurney, the secretary of the Hoxton Brothers' Angling Club, and Mr. Tom Hughes, its treasurer, having obtained a promised reduction for anglers in the fares of the Great Eastern Railway Company, invited delegates from all the angling clubs of London to meet them on the 30th April, 1872. Eleven clubs were represented at this meeting, which resulted in the formation of the first Anglers' Parliament of which I can find any record, under the title of "The United London Anglers' Central Committee" (now commonly called the "East Central"). A charge of 6d per member was made to cover the expenses of printing and management. On the 17th June the first issue of railway privilege tickets took place, 15 clubs taking 324 tickets. At the meeting to which I have referred it was resolved that the secretary, Mr. Ghurney, should communicate with the Great Western and London and South-Western Railway Companies, and endeavour to obtain similar privileges. At its next meeting, on 1st July, 1872, replies from these companies were read, requesting specimen privilege tickets to be sent them, and a committee of four delegates was then formed to wait on the companies, but no arrangement was concluded.

On 7th September, 1874, a committee was formed to inspect the fishing stations on the Midland Railway.

On the 2nd November, 1874, the Association first applied to this company for privilege tickets from Elstree to Sharnbrook. In January, 1875, a deputation was appointed to visit the secretary of the London, Brighton, and South Coast Railway, respecting cheap tickets for Pulborough. On 5th April another application was made to the Great Eastern Railway Company for further concessions. On the 7th June, a written application was made to the Great Western Railway Company to receive a deputation from the Society. November 1st, 1875, The Hammersmith United Fishing Club was enrolled, its secretary being Mr. T. Hoole and delegate Mr. P. Geen. On the 3rd July, 1876, it was proposed that the River Lea Angling Preservation Association should be amalgamated with the Society. This was agreed to on the 14th August, 1876. On October 2nd another appointment was made with the Great Western Railway Company, and on November 6th it was announced that a satisfactory arrangement had at last been concluded. Notwithstanding this announcement, a further appointment was made with the Company on 5th March, 1877, which appeared to culminate in a final settlement on the 9th April, 1877.

On a motion proposed by Mr. Geen, and seconded by Mr. Brooke, on the 3rd August, 1877 the charge for the Great Western and London and South Western Railway Companies' privilege tickets was fixed at

one shilling per member in addition to that already charged for the Great Eastern and Midland Railway Companies.

On the 13th September, 1877, a vote of thanks from the Amicable Brothers was passed to Messrs. Ghurney and Morgan, for their exertions in securing these concessions.

On the 15th October it was proposed by Mr. Murphy, and seconded by Mr. Aldridge, that the total charge for all railway privilege tickets be reduced to one shilling per member ; also that this Association do not amalgamate with the " West Central Association," established on the 4th April, 1877. The " East Central Association " now meet at " The Bald Faced Stag," Worship Square, Finsbury, E.C., at 9.0 p.m., on the first Monday in each month. Its secretary is Mr. R. Ghurney, and the chairman Mr. S. Morgan.

The origin of what is now generally known as the West Central Association was in this wise : Owing to the large amount of work thrown on the secretary of the East Central Association in preparing the annual railway privilege tickets, delays sometimes occurred, principally through the difficulty occasioned by the Great Eastern and Midland Railway Companies insisting on stamping each ticket before being issued to members. In order to remedy this state of things, a meeting took place at the " Star and Garter," St. Martin's Lane, on the 4th April, 1877, at which

representatives of twenty-four Clubs were present. It was then resolved to establish a Central Association under the style of "The West Central Association of London and Provincial Angling Societies."

On the 28th April, 1877, this Association made its first application to the Great Western Railway Company for permission to issue privilege tickets, and received a reply on the 30th instant, requesting the Society to fix a day for calling. This was done, and the concession was granted. On the 18th May, 1877, application was first made to the London and South Western Railway Company, and to the Midland, London, Brighton and South Coast, and Great Eastern Companies on the 22nd August, 1877, and concessions were shortly afterwards obtained from each of these companies, with the exception of the London, Brighton, and South Coast. In October, 1878, this Association, finding its room too small to hold the ever-increasing number of delegates, removed to their present place of meeting at the "Portman Arms," Great Quebec Street, W. The honorary president of this Association is Mr. Philip Geen ; chairman, Mr. Leo Bonvoisin ; and secretary, Mr. Thomas Hoole. Meetings are held on the third Friday in each month at 9.0 p.m.

The third Central Association was formed by certain delegates of the "West Central" preferring their old room at the "Star and Garter," St. Martin's Lane, to

that of the new one at the "Portman Arms." They therefore remained, and formed a society under the title of "The Central Association of London and Provincial Angling Societies," now generally known as "The Central Association." I regret having to state that, as far as I can ascertain, this Society has gained no special privilege for anglers. Neither has it responded to the invitations of the two other central societies to send and receive delegates at either its own or its contemporaries' monthly meetings. Notwithstanding its hitherto somewhat unsocial habits, I understand it has arranged to send six members of its associated Clubs to represent anglers at the coming Lord Mayor's Show. I believe this will be the first time on record that anglers have been so represented. The Central Association meetings are held the second Friday in each month at 9.0 p.m.; secretary, R. Stebbings; chairman, J. C. Murrey; and treasurer, F. C. Hatfield.

"The Angler's Benevolent Society" was founded by prominent members of the "East" and "West Central Associations" in 1878; its object being to render assistance to members in distress, according to the state of its funds and the merits of the case. The committee consists of seven representatives, and an auditor from each of the last mentioned societies, making a total of fourteen. The president is Mr. T. Spreckley; vice-presidents, Messrs. S. Morgan and L. Bonvoisin; trea-

surer, Mr. P. Geen ; trustees, Messrs. R. Murphy, G. Manning, and G. H. Field ; steward, Mr. G. H. Field ; and general secretary, Mr. R. Ghurney. The committee meet on the second and fourth Fridays in each month, at 9.0 p.m., at the New Forester's Hall, Clerkenwell. Members' subscriptions are one shilling each, payable in advance.

The United London Angling Association Fisheries Society was established at a meeting held at the "Star and Garter," St. Martin's Lane, on Wednesday, 18th January, of the present year. It is composed of thirty-six members and three trustees ; that is, twelve members and one trustee for each Central Association. The sole objects of this Society are to acquire, rent, stock, and preserve any water or waters for the exclusive use of Club members holding privilege tickets issued by either Central Association, and for which a charge is annually made of one shilling each.

The executive committee consists of fifteen members, five from each Society, having full powers to acquire and rent water without reference to the Society. Salmon, trout, and grayling not to be cultivated at the expense of the Society. The executive committee meet on the second Monday in each month, and the full committee on the second Monday in June, August, November, and February. The hon. secretary is T. Hoole ; president, P. Geen ; chairman, J. C. Murrey ; vice-chairman, R. Ghurney.

In order to impress upon you the importance of Guilds, I should like to relate what our cousins the Fishmongers have accomplished by means of their Guild, which is now styled "The Commonality of the Mystery of Fishmongers of the City of London." This Company takes the fourth rank of the twelve great Livery Companies of the City of London. It was formerly divided into Salt and Stock Fishmongers, each Company having its own hall and arms. At one time there were six halls adjoining each other in pairs, that is to say, two in Thames Street, two in New Fish Street, and two in Old Fish Street. The Salt Fishmongers were first incorporated by Letters Patent 11th Henry VI., 1433, and the Stock Fishmongers by Letters Patent of 24th Henry VII., 1509. The first charter is a patent in French, of 10th July, 37 of Edward III., permitting them self government; the second is dated 15th July, 38 Edward III., and is also in French; the 3rd in Latin, dated 28th July, of 38 Edward III.'s reign. Henry VI. united them on 8th February, in his eleventh year, 1433; they were again separated by letters patent, 20th September, Henry VII., 1506. They were finally united and fully incorporated by charter of 28 Henry VIII., 1536. All the fishmongers resided in the City; their quarter was between Billingsgate and the entrance of Upper Thames Street, Salt Wharf, and Fresh Wharf. Edward III. introduced Liveries, and was the first

king who became a Liveryman. He chose that, however, of the Linen Armourers, now the Merchant Taylors. He also changed the name of guild to that of craft or mystery.

The Fishmongers' Company have had the honour to contribute no less than forty-one Lord Mayors to the City of London, the sixth on *their* list being Sir William Walworth, who was also a member of Parliament. He was twice Lord Mayor, viz., in Edward III.'s reign, 1374; and Richard II., 1380. It was on the 15th June, 1381, this valiant gentleman gave Wat Tyler the memorable tap on his head, thereby stopping the Kentish rebellion, and saving the country from anarchy. Sir William Walworth was a Stock Fishmonger, and resided in Stock Fishmonger Row and Crooked Lane, and on the spot now occupied by their present hall, situate at the north-west foot of London Bridge. He was buried in his parish church of St. Michael's, Crooked Lane, now pulled down. The funeral pall used on the occasion of his burial is still shown at the hall in a glass case. Another celebrated fishmonger was Dogget, the comedian, who instituted the Coat and Badge Water Race, in commemoration of George the First's accession to the throne. This Company consists of a prime and five other wardens, twenty-eight assistants, and about four hundred liverymen. Curiously enough, however, there is *no* representative

of the actual business itself on the governing body of the Company, which is practically self-elected.

The Thames, from the City Stone at Staines, where the Thames Angling Preservation Society's operations cease, to Monkey Island, is preserved by The Windsor and Eton Preservation Society, Windsor ; from Monkey Island to the Shrubbery, by the Maidenhead, Cookham, and Bray Association, Maidenhead Bridge. The next stretch of water, extending from the Shrubbery to the Temple Mills, is preserved by the Great Marlow Association, Great Marlow. The Reading and District Angling Association preserve the Thames from Goring Lock to Shiplake Lock, and the Kennet from Reading to Aldernaston, Reading.

I now wish to point out one important defect in the constitution of our three Central Associations, and also in most of our Angling Clubs, viz., the want of a proper division of labour and responsibility. As regards our clubs, the defect is not so apparent ; but the secretaries of our Central Associations will, I think, endorse my statement. At all events, the Gresham Angling Association has already commenced a reformation, by the appointment of two of its committee to special departments, as, for instance, Curator and Librarian. But our water at Waltham, the record of fish weighed in, the Anglers' Benevolent Fund, and other matters equally deserve departments. And I trust ere long our Mr. Bentley will be appointed

our purveyor of food for the mind ; that is, that he shall be required to provide monthly readers of papers, or, in default, read one himself. You all know he is fitted for the post and capable of doing either.

I am aware that our Central Associations have committees for special objects, but the same overworked secretary has to attend all, or nearly all, the debates, there being no clearly defined departments such as the English Government or even the Gresham Grasshoppers possess. Now, we all know that when a man first goes into business he works at it himself if he wishes it to become successful. In process of time, as it increases, he adds first one foreman or clerk, and then another, each having his own department, until ultimately he (the master) takes no part in its mere routine, but would be at hand to advise upon all important matters. Such are the principles embodied in the constitution of the British Government, and also in that that I am about to recommend, and of which if you approve and will commission our secretary Mr. Crumplen to bring them before the angling world, and will support him with the full powers of the Gresham Angling Association, then I feel certain he will be able to overcome all opposition and carry out your instructions as successfully as all others with which we have entrusted him. I venture to think the times are propitious, for we are on the eve of a great International Fisheries Exhibition ; nay, the

greatest the world has probably seen. Our royal Princes are foremost in the good work, and the whole angling world has its thoughts directed towards London.

I trust I have satisfactorily proved to you the benefits conferred upon the present generation by the establishment of Guilds in the past. It only now remains for me to advise the establishment of an Association under the title of "The British Anglers' Guild." I further recommend its debates being held in public. This would give us a powerful institution ; having the means of both making itself known and its influence felt. As soon as we have established our claim to the confidence of Anglers, I have no doubt that every Angling or Preservation Association in the United Kingdom will esteem it an honour to associate with us.

The three secretaries, and all other officials of our present Central Associations will by no means find their occupation gone, and I am persuaded that the appointment as secretary to one of the departments which I am about to mention will confer greater honour than they—the secretaries—now enjoy, because they would then represent the whole angling fraternity of the United Kingdom, instead of, as at present, one-third only of the angling clubs of London. Gentlemen, the constitution which I recommend for our guild should be somewhat as follows : First, as to

delegates. The "East Central" Association receives from each of its enrolled Clubs one representative ; the West Central and Central, two. Anglers should always prefer a brace to a single specimen. There is at present some difficulty in ascertaining the exact number of clubs, in consequence of some of them being enrolled with one Central Association, others with two, and the remainder with all three. But the probable number at the present moment is 157. The expenses of management need not be heavier than at present, viz., a fee of ten shillings and sixpence for each club enrolled, and an annual charge of two shillings for each club member. Delegates will, I hope, remember that their guild debates are totally different from those held at their social clubs, and that refreshments should be taken in either a supper or smoking room, from which they might be summoned to divisions. This would materially improve the character of the debates and facilitate the transaction of business. Our next requirement will be a central hall, capable of holding from four hundred to five hundred members, with galleries for strangers. I advise either the Holborn Town Hall or the Foresters' being selected for this purpose. Our members having assembled, would proceed to the election of a president and a chairman of committees, and then to that of their government officials. These, I advise, should consist of a secretary, with a committee of ten members for each department.

I also propose that every important interest connected with angling should be placed under the care of one of these committees ; thus each railway company and river in the United Kingdom would have its own department for the transaction of all business connected therewith, and that only.

These committees would sit in private, either at the official club house of its secretary, or in a committee room at the guild's hall. The guild's privy council would consist of the departmental secretaries, and be presided over by the chief secretary, who would be the anglers' premier. I recommend that all officials should be honorary, but that a salaried clerk should be engaged to attend daily at the offices of the guild, and at its weekly public debates ; also that a paid warden should be retained who would be the guild's executive officer and the principal official for the maintenance of order at all its public debates ; he should also have the general supervision of river keepers, and all such like duties. During my concluding remarks I intend taking the liberty of associating the sentiments of several delegates with the names of the clubs they represent, and trust they will pardon me for so doing.

I now beg to call your attention to a few of the more important matters requiring the attention of our Guild ; for this purpose we will anticipate one of its Debates, as shown by a *supposed* extract

from our official organ, and which we will imagine has been inserted in the *Yorkshire Post* of 27th September, 1883, and which is to the following effect, viz. :—" Our readers will doubtless remember that in our last week's issue we mentioned that the members of 'The British Anglers' Guild' had again assembled for the resumption of business, after an adjournment of three months. At eight o'clock the house presented a very animated appearance as Mr. President was conducted to his seat by the Warden, holding his black rod of office. In front of the chair sat the Chairman of Committees and the Clerk to the Guild. The reporters' table was well filled. The Council of Secretaries occupied their accustomed places on the right hand of the President. The proceedings opened by the senior delegate of the 'Act on the Square Club' asking the Secretary of the Committee of the London, Brighton, and South Coast Railway Company whether any definite arrangement had been made, or permission obtained, for the issue of privilege tickets on this line of railway. All eyes were now directed to the gentleman indicated, who replied, 'that he was happy to congratulate the Guild on its having obtained all the privileges it sought, and that the chief secretary would shortly make a most important statement respecting this matter.' We ought, perhaps, to mention, for the benefit of our readers, that London anglers have

hitherto been obliged in the first place to apply to Mr. Jezrell Clout, of the 'Berkeley Castle,' No. 17, Rahere Street, Goswell Road, for a privilege ticket, but although its cost was small (we believe sixpence was the price charged), applicants frequently complained of having to wait an unnecessary time; and when they had obtained it the ticket entitled them to privileges on Sundays only. The chief secretary now raised the enthusiasm of members to a high pitch by stating that the South Eastern and London, Chatham, and Dover Railway Companies had each granted important concessions, and that all Metropolitan and local railway companies now issuing tickets extending over other lines had also granted like privileges; mainly owing to the tact, energy, and moral force brought to bear upon these railway companies by the respective secretaries of each department. He then proceeded to state that the privileges so granted were precisely uniform on all lines of railway, and that very shortly the Guild would issue tickets, which, on being presented at any London or suburban railway station, would entitle the member to receive a return ticket for any fishing station, available for one week, at a single fare; and for either class of carriage in use on the particular line on which the angler wished to travel. A few more questions having been asked and duly answered, the chief secretary again rose and proposed the following resolution, viz., 'That our

representatives in the Imperial Parliament of England be instructed to introduce forthwith a bill authorising that The British Anglers' Guild be appointed conservators of all the public waters of the United Kingdom, subject only to the supervision of the Imperial Fisheries Commissioners ; and that it be empowered to issue and enforce anglers' annual licences, of one shilling each, the proceeds to be spent upon the propagation and protection of fish. The cost necessary for the erection and repair of fish nurseries to be met by Parliamentary grants.'

"He then proceeded as follows : 'Mr. President and Gentlemen, your Council of secretaries are unanimously of opinion that this measure is one of the utmost importance, as it will enable the Guild to commence the efficient propagation and protection of fish, not at the expense of a few, but of the whole body of anglers. This measure will also enable us to more fully resist all encroachments on our rights by riparians or others, not only in the Thames, but in all the public waters of the United Kingdom ; and he was fully convinced that no true brother of the rod would regret the necessity of his annual licence when a good day's sport had become the rule, and not the exception.' This speech was followed by one from the Secretary of the Piscicultural Committee, who remarked, 'that the adoption of a thorough system of pisciculture was now becoming as necessary for our

public waters as agriculture was for land.' He then proceeded to ask the members 'what would they think of a farmer who treated his land as we do our public waters ; that is, trusted to the gleanings of the present year to supply the wants of the next ? Or, what would they say to the landed proprietor who employed no gamekeeper to superintend the rearing of game, and contented himself with paying the local police a small fee for every poacher convicted through their instrumentality ? He begged to second the motion with all his heart.' Many speakers followed, some being in favour, and others dissenting on various grounds.

"The junior delegate of 'The Hearts of Oak' remarked, 'This motion had his full support, because the Act of Parliament, when obtained, would enable the Guild to fire a broadside at the steam launches on the upper Thames, or on any other water of the United Kingdom, where these vipers were at present permitted to annually kill hundreds of thousands of the small fry that would, he had no doubt, otherwise have ultimately found a place in members' baskets or creels.' The next speaker was the junior delegate from 'The Free and Easy Club,' who remarked, 'He entirely agreed with the necessity of stopping steam launches, but was thoroughly opposed to the proposed annual licences ; he was an humble angler himself, and represented other humble anglers. He had been taught

to believe that the guild would obtain members' privilege tickets at about one half their former cost. He liked to roam where he liked, and fish where he liked, and objected to restrictions of any kind, even to the fence months ; and if more money was required to prevent poachers from netting, could not the government supply it, or some of the aristocrats ?' Here the speaker's voice was drowned by a perfect hurricane of voices shouting 'Order,' and 'Divide.'

"We are glad to inform our readers that this gentleman subsided without further ado. He sat down apparently greatly surprised at the storm he had so quickly raised, and was succeeded by the senior delegate of 'The Good Intent,' 'who expressed his contempt for the very selfish motives professed by the last speaker, and the more so that he also was another humble angler, and had the honour of representing others of the same class, and he felt proud to say he believed that as a body those he represented would scorn to do a mean action, ay, as much so, perhaps, as the greatest in the land. It was true his means were limited, but then his club would purchase his annual licence, as well as pay his or any other members' subscription to the guild, and their weekly subscriptions could be slightly raised, if necessary, to meet the very small extra expense entailed. He concluded by expressing his very hearty approval of the measure, and as he thought the subject had been sufficiently

ventilated to enable members to divide, he trusted the division would now take place.' This was immediately agreed to.

"During the preparation of the official lists the house presented a scene of great excitement; the council of secretaries crowded round the chief secretary, while other members of the assembly broke up into groups and eagerly discussed the probable result. That the issue was important was known to all, as, in addition to the importance of the measure itself, it was generally understood that the council of secretaries would resign if they obtained an adverse vote. And, therefore, upon the Warden calling for silence, every member quickly returned to his place, and amidst the breathless silence of the assembled delegates the president rose and said " But, gentlemen, I am no prophet, the decision rather rests with you. I have but endeavoured to interest you in my subject by drawing an imperfect picture of what may or might be. I have also refurbished the signpost erected by our forefathers, and re-painted their old directions to our proposed new guild. Can you hesitate to follow in their footsteps, seeing the great results they have achieved? If not, then I ask you this night to record your votes in favour of an United Anglers' Parliament—" A British Anglers' Guild."

DARLING AND SON,
MINERVA STEAM PRINTING OFFICE,
35, EASTCHEAP, E.C.

OF THE SPECIAL SENSES OF FISHES, IN
RELATION TO THE ART OF ANGLING.

No. 1.—VISION.

A P A P E R

READ BEFORE

The Gresham Angling Society,

BY

JOHN BRUNTON, M.A. M.D.

J. THEODORE CASH, ESQ., M.D., IN THE CHAIR.

"THE EYE SEES WHAT IT BRINGS ITS POWER TO SEE."—*Carlyle.*

LONDON :

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PAPER READ BEFORE THE GRESHAM ANGLING SOCIETY,
BY JOHN BRUNTON, M.A., M.D.

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MR. CHAIRMAN AND GENTLEMEN,

In introducing this subject to you, it seemed to me desirable to select a paragraph from some writer which would serve the purpose of a text.

I chanced to find one which I think is suitable in the writings of a "Father" who was cotemporaneous with our dear old Father Walton. Both are revered, respected, remembered and honoured, and though it may be out of place here to say it, I think it will be admitted that, as contemplative men, their writings are, have been, and I trust always will be, a great moral power for good.

At the very time when dear old Walton was enjoying

“his walks abroad” and, rod in hand, either rambling by the lovely meadows of the then silvery Lea or meditating by the rocky valley of the winding Dove, forgot not his innate pleasure of angling, nor thought “his idle time idly spent,” because he found

“Tongues in trees, books in the running brooks,
Sermons in stones, and good in everything.”

While thus “providing his store” of observations, facts, and fancies, which make his “Compleat Angler” so very interesting, amusing, and good,—John Bunyan, the author of my text, was cooped up in prison meditating also. Although deprived of the associations of those external worldly beauties which enliven man’s mind and cheer his soul, his thoughts came from his inner consciousness fully charged with its memories of the past. Though not writing for the recreation so much as the good of his fellow creatures, his books have been the pleasure and pastime, as well as for the advantage, of many a youth.

In his “Holy War,” which was published about the time Charles Cotton produced his treatise on “Fly Fishing,” you will find the following passage, which I have chosen as my text:—

“The famous town of *Mansoul* had *five gates* in at which to come and out at which to go, and these were made likewise answerable to the walls—to wit, impregnable, and such as could never be opened or forced but by the will of those within. The names of the gates were these: Eye-gate, Ear-gate, Mouth-gate, Nose-gate, and Feel-gate.”

To deal with these five gateways to knowledge in the special manner as relating to fish and the angler's art is a much more formidable undertaking than I at first contemplated, and as I desire to do the matter justice, and in such a way as is consonant with one's duty to a learned society like our own, I find that I can only take up one gateway at the present time, and that one for this evening is *Eye-gate*. In discussing this subject, Eye-gate, it is obviously necessary to consider (1) the eye-gate of the fisher, and (2) the eye-gate of the fish, for relatively fisher and fish become subject and object.

After the able manner in which Mr. Bentley* dealt with the general feeling in fishes, and the descriptions he gave, with illustrations of the brains and larger nerves, it is quite unnecessary for me to open up this subject again. I may, however, say that "it seems probable that all animals which possess a definite nervous system have a greater or less degree of consciousness of the impressions made upon it, whether by external objects or by changes taking place in their own organism, and to this consciousness we give the name of sensibility." Fish have a definite nervous system, and pointedly come under the category of sensible animals.

In the brain of fishes the optic lobe is very large

* See paper by Mr. B. on "Sense of Pain in Fishes."

in proportion to the other parts. Such development evidently points to a definite intention—a means to an end—and intimates to us that of all the senses that of *vision* is of most importance to the fish.

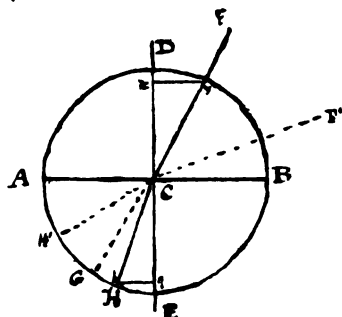
Vision, the most important and delicate of the special senses, involves not only impressions conveyed by the optic nerve to the brain, but the action of accessory parts, the structure of which is exceedingly complex.

For my purpose it will be quite sufficient to give you as simple descriptions as possible; there is no need to weary you with details which belong rather to the province of anatomy and physiology as applied to medical science.

Before proceeding further, I think it will much facilitate to make a few brief remarks regarding the properties of light, and their application to the theory of vision.

Light is the physical agent by which the external world is rendered manifest to the sense of sight. When light travels through the same medium, it travels in straight lines; when it passes into a denser medium, such as from air into water, the ray of light on entrance is refracted or broken back. For the sake of illustration I have drawn this diagram.

Water always finds its own level, so the line A B represents the surface of water which is here represented as *perfectly still*. Let us draw a perpendicular,

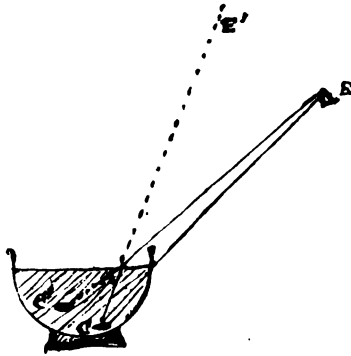


D E, through A B, cutting A B at C, and from centre C describe a circle, A B D E. Now, if we suppose a pencil of light—a bundle of rays—to pass in the direction F C, then these rays, instead of passing in a straight line to G, will be refracted at C to H, *i.e.*, bent towards the perpendicular; and if we draw the lines $x y p q$ at right angles to the perpendicular, and cutting F C at y , and C H at q , these lines are called sines of the two angles, F C D and H C E. $x y$ is, you see, longer than $p q$ by four to three; and the law has been laid down that the sine of the angle of incidence bears to the sine of the angle of refraction a constant ratio for each refracting medium. So that if the ray is bent towards the perpendicular on passing from air into water, the reverse takes place when the ray passes from water into air. Still the sine is in the same ratio.

This power of refraction has induced many to

believe that though they may see a fish in the water the fish does not see them. This is quite a mistake.

There are only two works on angling that I know of in which diagrams are used to explain the vision of fish. One is Ronalds', and the other a paper on the vision of fishes in the recent volume of "Anglers' Evenings." Both writers, like myself, make use of the diagram just explained. But I must now call attention to this one representing the experiment of the *invisible* coin, made visible by the refractive power of water. A line C E, drawn from the coin lying at the bottom



of the basin when there is no water in it to the angler's eye at E, must necessarily pass through the edge of the basin; but that being non-transparent the ray from the coin is intercepted and does not reach the eye—the coin is out of sight. By pouring water into the basin, another ray, C A E¹, is refracted at A—it is bent in the direction of the eye, A E. Now, whenever a luminous pencil passes in a straight line from a body

to our eye, we see that body exactly as it is ; but if in consequence of refraction, the pencil of light is deviated in its route—if it ceases to come to us in a straight line—we no longer see the body in its proper place, but in the direction of the luminous pencil (as $C^1 E$) at the moment it enters the eye. Now, here we have the pencil $C A E^1$, bent at the surface and travelling in the direction of the eye and entering it ; thus the eye reads the coin to be at C^1 and in the direction $C^1 E$.

In other words there is nothing changed in the position of eye or coin ; but rays from the coin have changed direction—those intercepted by the side of the vessel are still so intercepted, and the rays which before the entrance of water passed above the observer's head, are directed towards the eye, being refracted in passing from the water into air, and thus the coin appearing in the line of vision, is seen at C^1 . Refraction produces various curious phenomena, the effect of which is to deceive the eye by making us see objects in other than their true position. We do not see fish in the place they actually occupy, but nearer the surface by about a fourth, and they appear considerably smaller ; and it follows conversely, when a fish sees the angler he appears further off than he really is. You must therefore understand, that whatever may be the power of refraction, both spectator and object bear to one another the same relation. Were it not for the

water, the coin—or, if it were a fish—would not be visible, and conversely the angler's eye would not be beheld by the fish ; so if the angler under ordinary circumstances can see the fish, the fish can see him.

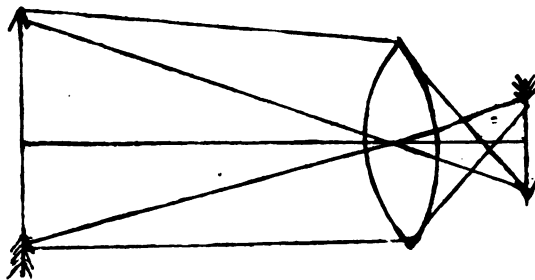
Following the principles of the refraction of light, Mr. Ronalds has given an illustration in his "Fly-fisher's Entomology" of a fisherman on the bank and another wading, and what both angler and the fish see, or are supposed to see. These illustrations are, to my mind, somewhat exaggerated. That of the angler on the bank just proves that if he can see a fish the fish can see him. The fish to the angler's eye appears much shallower, and the angler to the fish's view is high up in the air. Of course a portion of the bank ought to have been carried up also, and then the fish would see the angler in a rational position on *terra firma*, and not like a kite aloft in mid air. In short, the fish sees the bank as it always has been accustomed, and the angler or other human being that may chance to be there is but an accident of the locality. There can be no separation 'twixt angler and the bank.

The second illustration, representing the angler as wading, is of greater purport. It is necessary for me to explain that there is a limit to the passage of light rays from a denser to a thinner medium. This can be explained by trigonometrical principles, which it does not become me to introduce any further than I can help.

This limit is explained by the fact that rays of light passing from water to air at a greater angle than 48.28° are totally reflected, and if the water's surface be perfectly still the bottom of the pool is reflected on the under surface, so as to make *this under surface* as difficult to see through as the silent pool's *upper* surface is to the angler when trees, bank, hill, or dappled cloud are there to him mirrored. This under surface, with its picture of the bottom painted upon it, becomes a screen to hide the angler's body as he wades, but his legs are visible to the fish by direct rays through the water. Possibly the fish may take these legs, encased in wading stockings, as tree stumps, or something whose nature does not produce terror. I used to hear an aged uncle of mine—a great trout fisher of the past, and one who in lake fishing always waded—say that the trout were wont to strike him on the legs when he was in the water. I have many a time experienced the same, and so have his sons. This shows that the wader is very invisible. When I have been wading—as I have often done as deep as up to my watch pocket—fish have risen within a yard of me. Is it that the divided body of Ronalds is no longer a scare? If so, that may be a reason why the angler on his knees—to a certain extent well out of sight—becomes a kind of half body, and is less an object of terror than the man of perfect stature. It is obvious that a little man has a marked advantage over a tall one.

This is explained by the fact that obliquity of entrance into a denser medium has a marked influence upon the visibility of rays. The greater the obliquity—the greater the refraction—the less capable are the rays of discernment; for the distinctness with which the object is seen decreases in an inverse ratio. Thus the angler who stands on a low bank or wades even to a little depth is less likely to be visible than he who is higher up.

There are different refractive powers for different media. While air into water is as 4 to 3, air into glass is 3 to 2. Every one of you knows how advantage has been taken of this power of refraction to construct lenses. Without these we would possess but few



optical instruments. The human eye is one of the most perfect of these instruments, and the commonest and most popular optical apparatus of the present day, and which most nearly resembles the arrangements of the human eye, is the photographer's camera, an instrument with which everyone is familiar.

You have the lenses for concentrating, the screw

adjustment for focussing, the various stops for regulating the admission of rays, and the ground glass screen—or more correctly the sensitized plate on which is registered the optical image, as on the retina of the eye.

In the human eye, as seen by diagram, we have

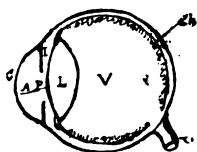


Diagram of Human Eye

beautiful examples of refractions, and their adaptation to the purposes desired and intended.

In front there is C the cornea and A aqueous cavity, then the iris I, behind it the lens L, and last V the vitreous or glassy humour. Through these we have successive refractions wonderfully adapted for producing at the base of the eye a perfect image of the thing looked upon.

At the base there is a R thin transparent network of nerve, spread out like a net to catch the image, and immediately behind this is a layer of dark pigment, Ch., called choroid, which absorbs the rays when they are no longer useful to the retina.

The part which gives beauty and expression to the eye is the iris, or curtain, in whose centre is the pupil, P. In warm-blooded animals this iris is muscular and

contractile, dilating when the light is weak, and contracting in proportion to the stimulus of its rays. The eye of a cat is a good example; witness in daylight how the pupil is but a slit, but when evening comes with its diminished light the eye appears as if it were all pupil. The pupil is to the eye what the stop is to the photographer's camera—it modifies the admission of light, cuts off the excessive and divergent rays, thereby making the image on the retina more perfect and receivable without pain or discomfort.

Now what are the conditions required for perfect vision ?

1st. A perfectly adjusted and sound eye.

2nd. A condition of light or illumination of the object which will put no strain upon the eye. Everyone from his experience knows what strain there is upon the organ in excessive as well as in defective light.

“Within our eyes at every instant a picture of the outer world is painted by the pencil of the sun upon the white curtain at the back of the eye, and when it has impressed it for a moment the black curtain absorbs and blots out the picture, and the sun paints a new one, which, in its turn, is blotted out, and so the process goes on all day long.” While the eye of man observes the external world with all its beauties of nature and art, it is difficult to say what fish see, if

they do admire anything in the depths, except their mates, neighbours, enemies, and food. A writer has thus put it : " To his eyes the sea is thronged with inhabitants, and look where he will he is always moving in a crowd. Whether he rises or sinks, he finds the waters populous with multitudes of diverse creatures, and every one of them is interesting to him, for those he cannot eat, eat him."

By far the most interesting part of this optical arrangement is that for adjusting the eye to see near or far-away objects as well as objects at any intermediate distance. This is accomplished by the action of a muscle attached to the capsule of the lens, which, by its contraction or relaxation as the case may be, enables the anterior surface of the lens to become flatter or rounder according to circumstances, and so alter the focus for near, medium, or distant vision ; this action is also aided by the iris or stop. The accommodation, as it is called, is known to everyone who uses an opera glass ; but though there is a similarity in effect the action is quite different. In the human eye the *curvature* of the lens is changed, in the opera glass or camera—by means of the rack screw the *position* of the lens is altered—and both in the eye and opera glass, at and by the *will* of the possessor, for the same end, viz., accurate vision.

Let us examine now the eye of a fish—I have taken the eyes of the cod (*Gadus Morrhua*) for dissection

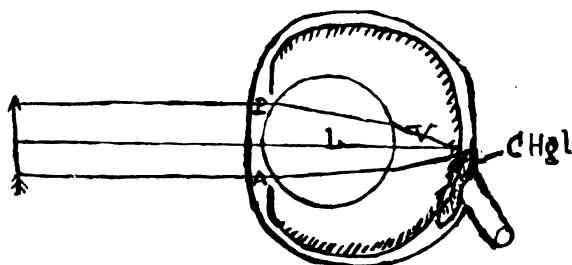


Diagram of Cod's Eye

and illustration, because they are large and easily procurable. You will observe that the outline of a vertical section through the middle is markedly different from that of the human eye. The human eye is very nearly spherical—the fish eye something like *two-thirds sphere*, very much flattened anteriorly ; posteriorly slightly. “Fishes in general, compared with other vertebrata, have large eyes. Sometimes these organs are enormously enlarged, their great size indicating that the fish is either nocturnal or lives at a depth to which only a part of the sun’s rays penetrate.”

The general skin in all fishes passes over the eye, but it is transparent at the orbit. There are neither eyelids nor tear-glands. There are many peculiarities in form, position, and size. I must refer you to works on ichthyology for the study of these curiosities. The eye of the cod will serve my purpose at present.

The eyes of fish, such as we usually angle for in fresh water and the sea are situated on the side and

anterior half of the head, and the outer covering is very much harder than that of man—mostly cartilaginous, and in some cases bony. Stewart and Stoddart, however, say that fish have their eyes with a set backward, which enables them to see behind to a moderate degree.

The anterior chamber and cornea are flattened—this is a provision of nature to protect it from injury and friction, for there are no eyelids ; there is very little aqueous fluid, just sufficient to float the free border of the iris.

The iris is merely a continuation of the choroid ; it is non-muscular, and as a rule incapable of contraction or expansion. The pupil, or stop-hole, is usually round ; sometimes it is diamond-shaped, pear-shaped, horizontally or vertically elliptical.

The lens is nearly spherical, and in this way makes compensation in refractive power for the diminished quantity of fluid in the anterior chamber. It is denser in the middle, is firm, and lies in the hollow of the vitreous humour.

The vitreous fills the posterior cavity of the eyeball, and is of greater consistency than in man ; and behind is the retina and choroid, with its dark pigment and vascular layer. The optic nerve emerges much as it does in man, and the muscles attached to the fish's eyeball are the same in number and similar in arrangement for its movement. There is this

difference, however, that they do not seem to act so quickly and with the same kind of expression which is an attribute of the human eye. Did anyone ever see a fish squint? Of course they cannot wink, for they have no eyelids, nor can they shed a tear.

You will notice this important fact, that to all appearance there is no arrangement of accommodation. I said to all appearance, but, were there not, fish would only be able to discern objects at very near distances. Now, how does this accommodation obtain? You observe (*vide* diagram) that I have drawn the outline of a body, C H g l, situate behind the choroid and round the root of the optic nerve. This is called the choroid gland or muscle. It is supposed that the fish at will can fill this gland with blood, and by its distension push forward the retina and choroid to a limited extent, and thus focus the eye.

There is a very interesting anatomical fact in connection with this vascular gland. In Teleosteans (Pseudobranchiæ)—such as we fish for—there are remains of an anterior gill which had respiratory functions during embryonic life. A change in the circulation has caused these gills to lose their function in adult fish, but the vessels remain, and carry highly oxygenated blood to the head and eye,—in Teleosteans to the eye only. Professor Jacob, however, considers this extra blood supply to the choroid gland to be only for nourishing the fundus of the eye. It is

also supposed that the fish can pull back the ball by the action of the muscles, and as the posterior portion of its wall is thin and flexible, alteration in shape is effected, and so the retina is pushed forward and the focus shortened—just as some photographers do. With a fixed camera they focus by moving the ground glass screen nearer or farther away, according to circumstances. This power in the fish's eye is a matter of supposition ; there is an amount of reasonableness in it nevertheless ; but I think, from the optical arrangements as a whole, the power of accommodation is limited, and those of you who are familiar with optics can easily understand how the sphericity of the lens is a bar to much alteration of focus, and consequent power of vision at long and unlimited ranges.

Now, what about practical and experimental facts ? In the fish's eye the pupil is fixed, and the rays of light are admitted just as they come, be they strong or weak.

Do fish see better on a medium or on a bright day ? What says analogy ? If the pupil of the eye of man be artificially dilated (and this can easily be done by the judicious use of atropine), in ordinary daylight his sight, *i.e.*, his power of discerning is rendered very defective, distance and definition being seriously interfered with, in spite of the accommodating power of the organ, and vision becomes actually painful. In bright sunlight he can scarcely see at all. How about fish ?

We know that they can see remarkably well in twilight, and even in what is to us comparative darkness. When we can no longer see our fly the fish go on rising freely. Is their sight better or worse on days when nature is brilliantly lit up by the all-powerful rays of the sun ? When one says it is too bright a day for fishing, is it always because the fisher, rod, and lures are thereby too visible to the fish's eye? or is not that the brightness drives the fish down into the depths and into shades ? The brilliance is too much for their sight ; the power of discerning food is minimised, and as man does not care to eat in the dark, because he cannot see what he is eating, or about to eat, so with fish, excess of light is worse to them than very little. Hence the reason why morning and evening fishing are nearly always the best, and the cloudy day, with its diffuse and modified light, is the angler's as well as the fish's desire.

No better example of the fact that fish are dazed by sunlight could have occurred than to-day (Nov. 30, 1882). I began fly-fishing for grayling at 10.30 a.m., and by 11 took six. Then the sun burst forth and all the morning clouds were dissipated. From eleven till one there was not a cloud, but a clear blue sky and a brightly shining sun. Genial warmth brought plenty of cock-winged duns on the water, and though the fish rose freely before sunshine, not one would show except at an odd place under a shady bank or tree so long as the sun shone brightly. By and by clouds

came up from the north and west and veiled the sun. No sooner was the brilliance dimmed—or more properly speaking the light made diffuse—than the fish rose freely and continued to rise, till a rift in the cloud let the sun out again, and all was as instantly quiet. The condition of the river's surface was smooth and slowly running; the water as clear as if it had been filtered. Contrast the effect of too much light with a deficient supply. Does not the angler shake his head and say "Bother that sun," when he has to fish with his face to it, and his flies float along on the water's surface invisible to him by reason of the too brilliant glare? Or in the twilight, when he desires to make his last cast or two over a rising fish, watch how he opens his eyelids and stares to catch each "lessening ray."

The light, then, that is best for full vision is a diffuse one—such light as exists on a day with thinly clouded sun, when the angler says, This is a good day for my sport—in other words the more diffused light a body sends to us, the more precisely can we distinguish it. Thus, the photographer seeking diffuse light arranges his operating room that it may either have a northern exposure away from the sun's direct rays, or clouds over his studio's glass roof with suitable blinds or semi-transparent paint. I take it, then, that the condition of light which make the power of vision in fish most perfect in their own element, are also the best for angling.

The range of the human eye is limited by extremes of nearness and distance, as well as by similar extremes of light. Its wonderfully accommodating power is proof of this. Conversely, the fish's eye is limited in range, but is quick at short and very short distances ; it is not tolerant of brilliant light, but, catlike, can see in darkness that to man's eye is felt.

The effect of direct bright piercing light upon fish is sometimes very peculiar. Fish are paralysed by bright unnatural lights, as in leistering, etc., or, terrified, jump out of the way (*vide* Franck, "Northern Memoirs," p. 151 : 1821), or they "go at" the light much as a bull does at a red rag. It is well known that flying fish may be caught in quantity during the night, and the plan adopted is to hang a bright lamp over the ship's side. The fish spring in the direction of the light, and are either taken by a judiciously arranged net or fall on board the vessel. I am quite certain that these fish do not see where they are going—there is no diffuse light ; they rush at the light—beyond is darkness. Were the conditions otherwise I am sure they would be scared, and not leave their own element to meet death on deck, land, or in the pot. Is this not a kind of fascination like that of a moth as it flutters round the candle light?

A great portion of what I have said to you so far is all very well in theory, and when looked at from a diagrammatic point of view may be very pretty.

These illustrations are drawn to show the effects of light and vision in perfectly still and pure water. It is not difficult to understand or comprehend by contrast what takes place when the water surface is ruffled by wind, blurred by rain, or broken by fall or stickle. Alas! by this breaking of the surface all my fine straight lines then become distorted, my pencils of rays have gone off like bursting crackers, and the beautiful image of the angler, painted in the still lake on the pretty fishes' little eye, has become, by the influence of this gentle zephyr's ripple, as blurred and distorted, nay, as invisible, as your face or mine would be when looked at through this sheet of corrugated glass.* Just as the angler, with his gifted optical apparatus for keen sight, finds it impossible to discern a fish when the water's surface is broken, so as certainly is it impossible for the fish to discern its angling enemy. Though one cannot see any distance, perhaps beyond an inch, through corrugated glass, there is no difficulty in seeing objects in immediate contact with it, *e.g.*, compare this fly on the glass with a fly on the surface of roughened water. Perhaps the reason why trout so often spring into the air when tempted by a drifting fly is that the blurring effect on the surface interferes with their measurement of distance. One knows how trout, grayling, dace, roach, and chub suck in, with

* This was illustrated by the use of a sheet of roughened glass.

gentlest purl, the flies which drift along a glassy surface, having dropped from the overhanging boughs or waving grass and flowers adorning the water's bank, or may be lighted, life-like, from the angler's line. There is no rush or dash. Contrast this with the flying leaps that trout make when one is fishing on a lee shore, and casting among the breakers, and ask the question, Why is it so? My answer is, the power of judging distance is marred, and the trout is deceived. Were it possible for trout to see—to recognise a boat with its contained enemy drifting along a lake surface roughened by a gentle breeze, they would be scared and off long before the angler's fly could lure them. What is one's experience? Is it not quite the contrary? Is it not that, of successful methods of catching trout in a lake, this is the most successful? Nevertheless, the angler is up in a boat—more often standing and as much exposed as on a high bank—and yet it is a matter of every-day experience to find fish come up and take the artificial fly e'en at the vessel's side. So in stream fishing, if there is a good ripple on the surface the fish will just as soon take the angler for a tree as for a man, *i.e.*, if the fish can discern any object out of the roughened water that is distant more than one inch.

I need not say how my argument, if correct—and I have no doubt about it myself—*modifies* the much-vaunted doctrines of up-stream fishing. I do not

mean to say that it is not an advantageous method in certain circumstances, such as in fishing sluggish streams, say chalk streams, where the water is clear as gin and there is little disturbance of the surface; but when up-stream fishing is cast into one's face as *the only* method, then I must say I wholly differ.

Now, as regards the effect of the angler's shadow on the water, and his rod glistening with highest varnish or grand French polish, it wholly depends on the condition of the surface. You will observe that the *worst* condition for fishing is absolutely still clear water, coupled with brilliant sunshine. It is needless almost to say in such conditions what shadow or rod, or moving rod alone would do,—surely scare every fish away that is within twenty yards.

While the sun may be in its full power and brilliance to the angler, it is very much modified and diffused to the fish, by the action of an uneven and a roughened surface. The straight-piercing, all-searching rays are refracted, diverged, dispersed, and interfered with in a manner similar to the loss of power which discordant undulations of sound undergo as they either modify the power or tend to destroy one another. One knows how the sunlight becomes diffused and toned down by passage through roughened glass, and that the sun can be gazed at through it, while it is impossible to do so through clear, smooth plate.

Many a time I have had a good fishing when, standing up in a white-painted boat, I have drifted along with the sun at my back and my flashing rod hard at work ; but there was a good ripple on the water, and thus neither boat, nor fisher, nor rod—each with their shadows—proved obnoxious, for all were *practically invisible* to the trout ; and yet the light was diffused enough by the dispersing power of the wavy surface to tempt the fish from their places of shade and refuge to come forth and feed.

Now, as to muddy water and the power for fish to see in it, I can only remark—as I said to a friend the other day when I was spinning for jack in the river Lea—“ I might as well expect a jack to take my bait in such water, as for a London ‘ bobby ’ to catch a thief in a London fog.” Of course, if the thief were to run into the policeman’s arms, or the bait to rub itself against the jack’s nose, there might be a catch !

How far can a fish see ? To most people this is simply a matter of conjecture. Perhaps one of the best tests is one that depends on a most important part of the law of self-preservation—I mean fear of enemies. I have made a good many observations on this point, and notably in the circumstances when shy fish have been quietly resting and waiting for the luscious flies to drop down stream within reach, so that the smallest possible effort might be called forth in their capture, the water at the same time being

clear as crystal, slowly flowing, smooth of surface, and about two feet deep. As I have walked down the bank I have found the fish start off at 18 yards distance at the farthest, some at a much less distance. In one special case I saw a fish quietly swimming in three feet of water,—it was plainly visible ; it seemed not to see me, or if it did it was not afraid. I dropt my fly over it and hooked it on first trial ; this fish was not above six yards off. When walking up bank I have seen the fish go off at about eight yards length from me at farthest ; in many cases I was almost upon the fish before they started.

Some fishes can see (like a hare) in a backward direction, but as a rule our common fishes, if you go towards them directly from behind, can be approached very close. On one occasion, fishing up stream, wading in rough broken water, I dropped a worm-baited hook about a foot in front of my legs, and took a trout.

A very interesting part of my subject is the perception, discernment, and, if I may use a classical expression, the diagnosis-power possessed by fish in distinguishing colours. I need not enter here into the details of different flies, having different colors, or of how one fly takes better in one place than another, and so on—how bright flies, with lots of silver or gold in their structure and brilliant body hues, are very attractive on Highland lakes and rivers, while

more sombre flies fill the same rôle in southern streams. Most anglers are acquainted with the flies for different streams, and well know when and how to use them. But certain I am of this, that trout and grayling have a predilection for certain colours, and these are green and red. Of the red the late Rev. Chas. Kingsley says that they "like something that has an appearance of flesh."

Of the preference trout have for one colour over another, I cannot do better in the way of illustration than relate a little experience of my own. There is a fly which is one of the favourites in the north, in almost every lake, and is generally held in the acceptance of north-country anglers as one of the most killing. It is not an elaborate fly; it consists of a black hackle with a red tag, and is known as the Black Watch or Zulu. Now, one day, a few years ago, my brother-in-law and I were fishing from a boat on Loch Shin, in Sutherlandshire, and a steady breeze blew from the south-west. We fished with marked success the lee side, or that on which the waves were breaking, but as such fishing is rather uncomfortable for the occupant of the boat's bow when there is a bit of a sea on, by reason of the sundry bruises and scrapings his shins are subjected to, in addition to the insecure foothold and ever-ready tendency thereby produced to topple overboard when a wave interferes with the equilibrium of boat and angler, I gave

directions that we should pull across and fish the weather shore.

The Black Watch had done good duty—done duty so well that on arrival I found that my brother-in-law's fly had been picked to pieces, and he naturally asked me for another to replace the one worn out. I searched my book, expressed my regret I had not one left, when the boatman said, quietly, "There is a gentleman comes here to fish, and gets a great many; he fishes with fly of the same kind with a *white* tag." No sooner said than I dropped down into the boat's bow, out of the wind, and "fashioned a fly"—black hackle with white tag—handed it over to my friend, who, adjusting it, began to fish. At first cast he took a trout, then another and another, and so on, I fishing all the while with the Zulu (black and red ;) not a fish could I take so long as the black and white was on the water. Our casts were so closely made that there could be no excuse for saying we were fishing different water. Finding myself so beaten, for I could not get a fish, I again sat down in the bow and made a white tag for myself—began, and we got fish about for a time; then, unfortunately—or rather, fortunately for me, a fish took off my fly, and my little game was ended only to be begun again more fiercely. Examining my book, I found that some years before I had made some black hackles with *yellow* tag, but had never ventured to try one; in present circum-

stances I put one on, and under all the same conditions ; so soon as my fly with the yellow tag touched the water I had a fish. So attractive was it that I spoilt my friend's fishing ; he could not after that get a fish, while every one that was going fell to me. Since that day I have used red tag and yellow tag at one and the same time, and found the yellow preferred.

As regards selection of colour, the following anecdote will perhaps interest you and illustrate :—My friend, Dr. R—— related to me that twenty years ago he often used to fish the Wandle. He took with him a friend one day, whose success was almost exasperating ; nearly every fish he saw rising he was able to take. Dr. R. asked, “ How did you do so well, and what fly did you use ? ” His friend said, “ I have flies made like your own, but they have a particular body ; that body is raw China silk, yellow when dry, but on being wetted it assumes a pale green colour. Now, with this fly,” he said, “ trout could be taken when they were refusing everything else.” Dr. R. managed to get some of the silk and had flies made, with which he captured trout in any water. Everywhere he went trout yielded to this yellow-turning-green body. By mischance my friend lost his silk, and though he has tried the various silk merchants of this great city he has never been able to get the same kind of material. He thinks its efficiency was due to some peculiar method of preparation done in China, which has been given up or changed. Only

the other day he said to me, "If I could but get that silk I could catch trout anywhere. I have tried sample after sample, till I have a drawer full, but none of it will do."

Doubtless there are some things I have overlooked, but the most important I trust I have put before you. Before concluding I would just like to say a few words regarding the discernment of the angler's hook or hooks by fish; I need not say much. Hitherto I spoke of the discernment of colour and flies. But the angler's fly carries a hook—sometimes two. It takes very little common sense to comprehend that if the fish was such a discerner of hooks and hook-points as is so strongly put in books of instructions on bottom fishing—I don't care what kind—there would be an end to all fly-fishing, spinning, snapping, &c. What does a fish know of a hook till it is pricked or fixed?—nothing. It then recognises something as having stung it. A fish knows infinitely less of what a hook is than a human being, alike ignorant of fish and fishing, who has had a hook presented to him for the first time. Man may reason out a use for the hook—a fish cannot. If I may speak from experience, and I think from what I have done in trout, perch, roach, dace, and gudgeon fishing with worms, as well as in sea-fishing, and I have had a fair share of practice during the past forty years, I say, emphatically, that throughout all this time I have invariably fished with

the point and barb of the hook exposed. Such baiting may not look so pretty, but it is more effectual. Doubtless many will differ with me on this matter, but how are we to get over the exposure of the hook in all flies. In a rapid stream or broken water the hook certainly is not so visible ; but in fishing with a dry fly in smooth water, there floats the fly with its neck, bend, barb, and point of hook exposed. If you have the right fly no hook or part of it will deter the voracious fish.

Then if we take an extreme case, is it not the experience of the vast majority of fly fishers to have, at some time or other, the favourite fly of the day picked to pieces, the wings torn off, the hackle plucked out by the root, body and hook being only left, and yet this denuded fly has continued to be the most acceptable to the fish of any going ? If one says, " Oh, you have feathers to cover your hook ! " Then how about the covering and concealment in this case ? The truth of the matter is as I have said before, the fish knows not what a hook is. Nevertheless I do not deny the necessity and advantage as occasions arise of *fine*-fishing as it is called. Having alluded to the fearlessness of fish towards such an enemy as our barbed hooks, it is quite a different matter when humanity shows his face and is observed. Instinctive dread enters just as if the fish were aware that man came to desolate more than replenish the earth. " For

a cow might come and look into the water and put her yellow lips down, a kingfisher, like a blue arrow, might shoot through the dark alleys over the channel, or sit on a dipping withy bough with his beak sunk into his breast-feathers ; even an otter might float down-stream, likening himself to a log of wood, with his flat head flush with the water-top, and his oily eyes peering quietly ; and yet no panic would seize other life as it does when a sample of man comes."—*Lorna Doone*.
As a sort of *résumé*—

1. The eyes of fishes are much inferior optical instruments to those of man.

2. Though the range of sight is limited, it has one advantage over man's—that it can be used with a much more diminished quantity of light, but is defective in opposite conditions.

3. The eye of the fish is a means of self-preservation—quick to see food, and more quick to see an enemy—in his own element and out of it.

4. When the angler can see the fish, it is a rule that the fish can see the angler.

5. The best light for fishing is a diffuse light—such as when the sun is clouded over—for then the fish come out to feed, can see their food, and search for it without pain or discomfort. And conversely—

6. The worst fishing light is brilliant sunshine ; not that the fish can see the lures more easily, but because the fish are dazed, and seek shelter.

7. A ruffled surface, by dispersion of rays, utterly obliterates the fish's view of anything out of water beyond an inch or so from the surface. A running water does the same, but to a less extent.

8. Fish have a power of selection of colours, for food.

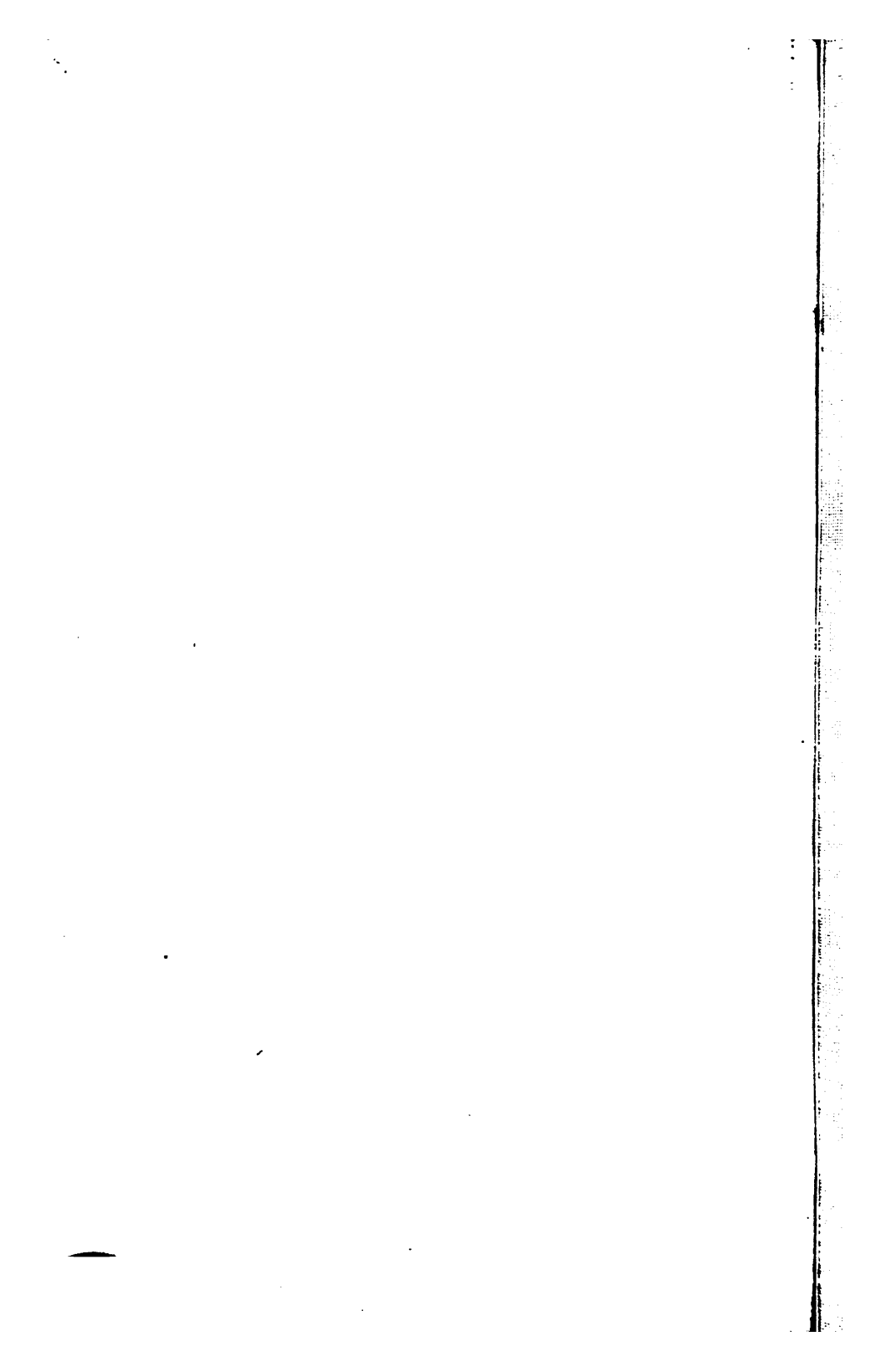
9. The colour of anglers' clothes is not of so much importance as keeping out of sight—dim or green garb is best—but it is the angler's eye and face that frighten most.

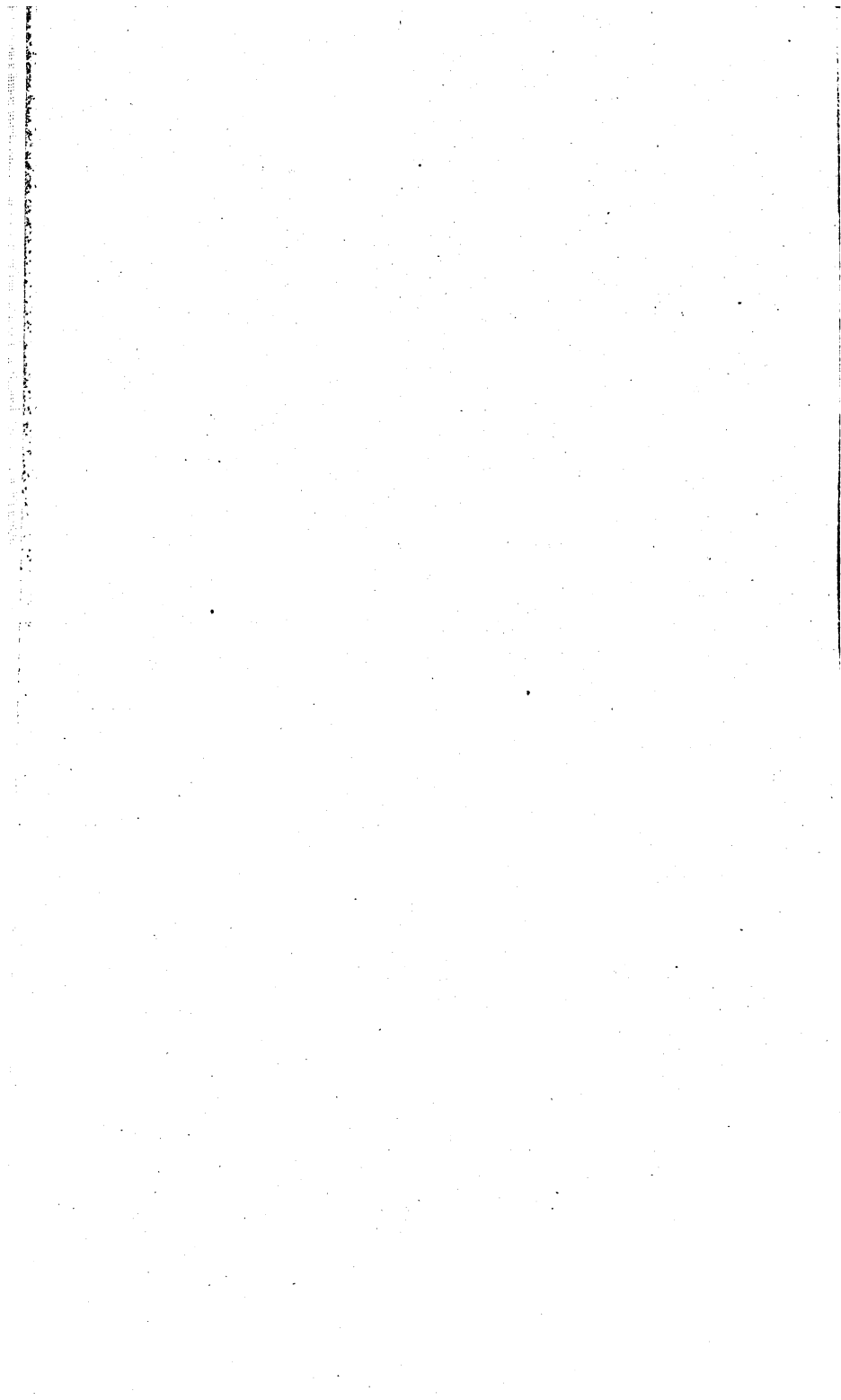
10. Fish no doubt sleep, though they have no eyelids to shut out the light.

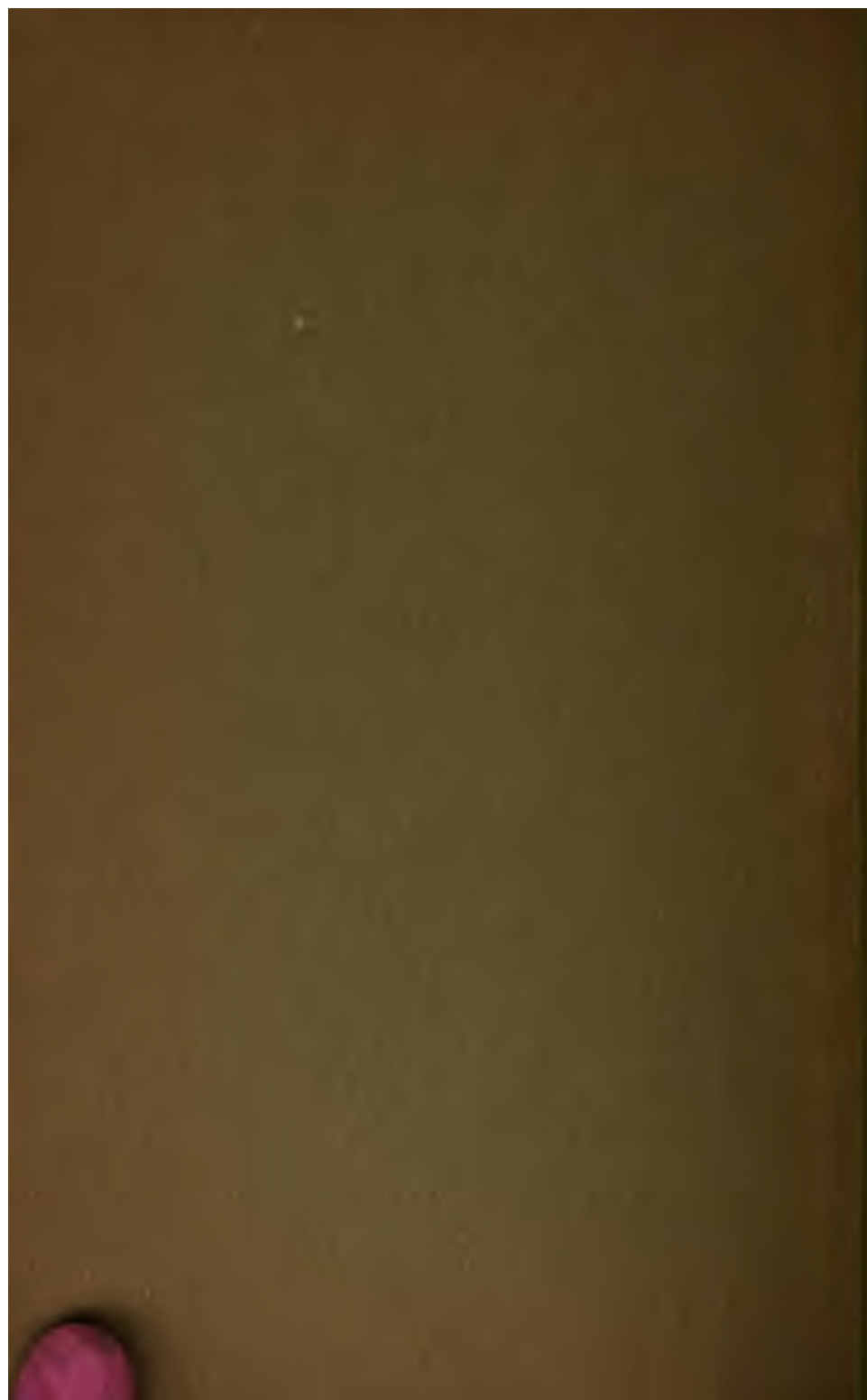
11. Till a fish has been pricked or hooked it is quite ignorant of the existence of such a thing as a hook; and were it possible for it to be recognised by the fish, voracity would overcome fear.

12. It is the angler's duty to keep himself as much as possible out of sight.









JUN 21 1933

